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No.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1983

BURROUGHS CORPORATION,

Petitioner,

vs.

A. B. DICK COMPANY,

Respondent.

APPENDIX

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APPENDIX A

MEAD DIGITAL SYSTEMS, INC., Plaintiff,

v.

A. B. DICK COMPANY and Gould, Inc., Defendants.

A. B. DICK COMPANY and Gould, Inc., Plaintiffs,

v.

The MEAD CORPORATION, Defendant.

Nos. C-3-78-177, C-3-78-287.

United States District Court, S. D. Ohio, W. D.

Aug. 7, 1981.

Suit was brought for patent infringement. The District Court, Rice, J., held that: (1) claims 1 and 33 of patent No. 3,596,275 disclosing oscillographic for directly recording on paper a picture of wave form of electrical signal as a function of time was valid but not infringed, and (2) claim 2 of patent No. 3,298,030 for device requiring signals representation of "predetermined characters" for charging succession of ink droplets so that they are deflected to produce printing was invalid to extent it claimed invention of use of sine wave generator in connection with operation of another invention and it was invalid because differences between subject matter

sought to be patented and prior art were such that subject matter taken as a whole would have been obvious to person of ordinary skill in the art at time invention was made.

Judgment accordingly.

1. Patents ⇐283(1)

Equitable interest of third party in patent may not be asserted as defense in action for infringement brought by owner of legal title to the patent.

2. Patents ⇐290(3)

Maintenance of infringement action was not precluded by failure to join government as a party, even if one of patents in suit was developed in course of research project sponsored by United States so that government had equitable title.

3. Patents ⇐311

Since defendant in patent infringement case raised and then abandoned idea of joining government as a party in order to determine extent of government's interest in the patent, court had no jurisdiction to consider defendant's claim that title was in the government.

4. Patents ⇐312(2)

In patent infringement action, plaintiffs were not entitled to have exhibit added on ground that failure to offer it at trial was inadvertent, where exhibit was originally marked as defense exhibit, but was withdrawn by defendant at trial's end, and

plaintiffs were given opportunity to adopt exhibit but declined to do so and later sought to rely on exhibit to defend against defendant's assertion that one of the patents in suit was invalid.

5. Patents ⇐312(1¾)

In infringement suit, defendant who asserts laches has burden of proving unreasonable delay by plaintiff in filing suit after first notice of infringement, but defendant is aided by presumption which is derived from statutory period of recoverable damages. 35 U.S.C.A. § 286.

6. Patents ⇐289(4)

Plaintiff in infringement suit filed longer than six years after notice of infringement will be barred by laches unless he can rebut presumption of unreasonableness in delay by showing good excuse therefor, rebut presumption of prejudice, or show such egregious conduct on defendants' part that equities otherwise weigh in plaintiff's favor. 35 U.S.C.A. § 286.

7. Patents ⇐289(4)

Defendant's own initially uncertain plans for development of allegedly infringing printer and commercial uncertainty of printer for extended period thereafter were sufficient basis for concluding that plaintiff's delay in filing patent infringement suit in excess of six years was not unreasonable as matter of fact and did not preclude

prosecution of infringement action on theory of laches. 35 U.S.C.A. § 286.

8. Patents ⇐167(1¼, 1½)

Ambiguous claims in patent must be read in light of invention disclosed and cannot be given construction broader than teachings of patent as shown by drawings and specification.

9. Patents ⇐165(4)

Since patent disclosed only oscillographic recording, scope of its claim was limited to oscillographic recording.

10. Patents ⇐165(2)

Patent must be judged by what is claimed for it in patent application, not by what is asserted in subsequent litigation.

11. Patents ⇐328(2)

Claims 1 and 33 of patent No. 3,596,275 disclosing oscillographic for directly recording on paper a picture of wave form of electrical signal as a function of time were valid but not infringed. 35 U.S.C.A. § 103.

12. Patents ⇐328(2)

Claim 2 of patent No. 3,298,030 for device requiring signals representation of "predetermined characters" for charging succession of ink droplets so that they are deflected to produce printing was invalid to extent it claimed invention of use of sine

wave generator in connection with operation of another invention and it was invalid because differences between subject matter sought to be patented and prior art were such that subject matter taken as a whole would have been obvious to person of ordinary skill in the art at time invention was made. 35 U.S.C.A. §§ 102(f), 103, 282.

13. Patents ⇐237

Accused device may be found to infringe on patent, if not literally, as equivalent of claimed invention, if accused device performs substantially same function in substantially same way to obtain the same result.

14. Patents ⇐112.1

Presumption of validity of patent gives grant substance and value but is not conclusive, presumption has no independent evidentiary value in infringement litigation and it serves only to place burden of proof on party who asserts invalidity as defense to infringement. 35 U.S.C.A. § 282.

David C. Greer, Howard P. Krisher, Dayton, Ohio, Dugald S. McDougall, Keith V. Rockey, Chicago, Ill., for A. B. Dick Company & Gould, Inc.

Armistead W. Gilliam, Jr., Dayton, Ohio, Bill Durkee, Edward W. Goldstein, Ben D. Tobor, Houston, Tex., for Mead Corp.

Appendix A

OPINION

PRELIMINARY MATTERS DISPOSED OF; A. B. DICK NOT PRECLUDED FROM PROSECUTING INFRINGEMENT ACTION BY LACHES; MEAD *DIJIT* PRINTER HELD NOT TO INFRINGE, LITERALLY OR AS AN EQUIVALENT, ON CLAIMS 1 OR 33 OF SWEET PATENT OR ON CLAIM 2 OF LEWIS–BROWN PATENT; SWEET PATENT DEEMED VALID; LEWIS–BROWN PATENT DEEMED INVALID; DEFENDANT TO PREPARE JUDGMENT ENTRY WITHIN STATED PERIOD OF TIME IN ACCORDANCE WITH THIS OPINION

RICE, District Judge.

I.

This case brings before the Court two patents in the field of ink jet printing and a device, the Mead DIJIT printer, which is alleged to infringe on those patents. The case came on for trial before the Court sitting as the trier of fact. Certain preliminary matters are addressed immediately below. The Court's findings of fact and conclusions of law, as required by Fed.R.Civ.P. 52(a), are set forth further below.

Appendix A

II.

Because one of the patents in suit (the Sweet patent) was developed in the course of a research project sponsored by the United States Government, Mead says that the Government has equitable title thereto under the common law and pursuant to federal regulations. Since the Government is not a party to this action in infringement, and since the law requires that every owner of a patent must be joined before an infringement suit can be maintained, Mead contends that this action in infringement of that patent cannot be maintained.

[1–3] Although, as Mead points out, there is a conflict among reported decisions on this matter, this Court must conclude, in accord with the great weight of authority, that the equitable interest of a third party in a patent may not be asserted as a defense in an action for infringement brought by the owner of legal title to the patent. *See Mercantile Nat'l Bank of Chicago v. Howmet Corp.*, 524 F.2d 1031, 1034 (7th Cir. 1975), *cert. denied*, 424 U.S. 957, 96 S.Ct. 1435, 47 L.Ed.2d 364 (1976), and cases cited therein. The Court also notes that Mead raised and then abandoned the idea of joining the Government as a party, herein, in order to determine the extent of the Government's interest in the patent. This Court concludes that it is without jurisdic-

tion to consider Mead's claim that title is in the government. *See also Mead Corporation and Mead Digital Systems, Inc. v. United States of America, et al.*, 652 F.2d 1050 (D.C.Cir.1981).

Accordingly, the Court does not consider the question of the Government's interest in the Sweet patent in the findings and conclusions set forth below.

After the close of the evidence in this case, plaintiffs * moved for an order enlarging the record by the addition of two exhibits. Mead does not object to the addition of the first exhibit, the Donahue deposition, and accordingly, it will be added to the record as plaintiffs' exhibit A–237. The Court notes, in passing, that plaintiffs rely on this exhibit as evidence of Mead's interest in acquiring a license under one of the patents in suit (Lewis-Brown), and to challenge Mead's assertion in its brief that plaintiffs proposed findings were incorrect on this matter. Since the Court finds and concludes below that the accused device does not literally infringe, nor infringe as an equivalent of that patent, the question

* Because this action is a consolidation of two cases, one of which involves A. B. Dick and Gould as Plaintiffs and the other of which includes Mead as Plaintiff, the parties have agreed that, for purposes of the trial, A. B. Dick and Gould would be referred to as Plaintiffs and Mead as Defendant. (Pg. 2, Final Pretrial Order, 10/29/80).

of Mead's interest in the patent during the development of the accused device is wholly irrelevant.

[4] Mead does object to the second exhibit which plaintiffs seek to have added to the record. Plaintiffs seek to have the second exhibit added on grounds that the failure to offer it at trial was "inadvertent." The exhibit in question was originally marked as a Mead exhibit but was withdrawn by Mead at the trial's end. Plaintiffs were given the opportunity to adopt the exhibit but declined to do so. Plaintiffs now seek to rely on the exhibit to defend against Mead's assertion that one of the patents in suit (Sweet) is invalid.

Under the circumstances, the Court is not satisfied that Plaintiffs' failure to offer the exhibit at the close of trial was inadvertent. Accordingly, the exhibit will not now be added to the record. However, while the Court notes that the exhibit is relevant to the issue of one of the inventor's disclosures to the patent office, the Court further notes that the exclusion of the exhibit does not prejudice plaintiffs since the Court finds and concludes below that the particular disclosure in question (or, more correctly, failure to disclose) does not affect the validity of the inventor's patent.

Finally, it will be noted that the Court finds and concludes below that the accused device does not infringe either of the pat-

ents in suit. Although it is not necessary to address the *validity* of the patents in suit under such circumstances, the Court is of the opinion that the public importance of and public interest in the validity of the patents in suit, as well as the substantial cost borne by the parties in litigating the matter, dictate that the Court determine the validity issues presented to it. The Court notes that such comprehensive disposition of infringement suits has been approved in this Circuit as "the better procedure." *Tappan Co. v. General Motors Corp.*, 380 F.2d 888, 890 (6th Cir. 1967).

III.

Findings of Fact

A. *The Parties, Patents in Suit, and Proceedings*

1. A. B. Dick Company (hereafter "A. B. Dick") is a Delaware corporation, having its principal place of business in Chicago, Illinois. Gould, Inc. (hereafter "Gould") is also a Delaware corporation, and has its principal place of business in Rolling Meadows, Illinois.

2. The Mead Corporation is an Ohio corporation, having its principal place of business in Dayton, Ohio. Mead Digital Systems, Inc., also an Ohio corporation, is a wholly-owned subsidiary of The Mead Corporation. For sake of brevity, The Mead Corporation and Mead Digital Systems,

Inc., will be referred to collectively as "Mead."

3. All the parties have a regular and established place of business in the Southern District of Ohio. No issue as to jurisdiction or venue is involved.

4. United States Patent No. 3,596,275 (the "Sweet patent") issued on July 27, 1971, on an application filed on March 25, 1964. That application was called a continuation-in-part of an earlier application filed July 31, 1963. On September 19, 1972, the inventor named in that patent, Richard G. Sweet, executed an assignment conveying his entire right, title and interest in U. S. Patent No. 3,596,275 to A. B. Dick.

5. United States Patent No. 3,298,030 (the "Lewis-Brown patent") issued on January 10, 1967, on an application filed July 12, 1965, and names Arthur M. Lewis and Arling Dix Brown as the inventors. That application was called a continuation-in-part of an earlier application filed on January 13, 1965, which in turn was called a continuation-in-part of yet an earlier application filed September 25, 1964. Gould is the owner of that patent, and A. B. Dick is the exclusive licensee under it.

6. A. B. Dick and Gould first filed suit in Chicago against The Mead Corporation for infringement of the Sweet patent and the Lewis-Brown patent, based upon Mead's development and use of a printing system called the DIJIT printer. Mead Digital

Systems, Inc., thereafter filed an action for declaratory judgment before this Court, seeking a declaration that Mead Digital Systems, Inc., has not infringed either of the patents in suit. (Case No. C–3–78–177). The Chicago case was, with the consent of all the parties, transferred to this Court where it was consolidated with the declaratory judgment action brought here by Mead Digital Systems, Inc. (Case No. C–3–78–287).

B. *The Art Prior to Sweet*

7. In the 19th century, Lord Rayleigh investigated the scientific phenomenon that a stream of liquid drops issuing from a nozzle could be made uniform in size and spacing by imparting cyclic energy (vibrations) to the liquid as the drops formed at the nozzle tip.

8. The basic concept of recording electric signals on paper with a controlled jet of ink has been known for some years. In claim 4 of the Schroter Patent, No. 1,882,-043, which issued in 1932, one aspect of the Schroter invention is described as follows:

> The method of recording signals on a recording surface in accordance with received signal energy impulses which includes continuously projecting a jet of recording fluid along a predetermined path toward the recording surface, electrically deflecting the path of the record-

ing jet in accordance with received signal energy impulses, producing markings by the recording jet upon the recording surface during periods of deflection, and interrupting the marking action during the absence of electrical effects producing deflections in the jet.

The Schroter patent also discloses the concept of moving the paper past the jet to effect recording (e. g., claim 8). The Schroter patent does not discuss use of a jet consisting of a succession of uniform ink droplets, but it does disclose that electric signals for recording can be used either to control the instantaneous intensity of charge of the jet or to control the intensity of the deflecting electric field.

9. The Jacob patent, No. 2,577,894, issued in 1951, discloses an ink jet system operated in a binary or on-off manner in which ink or other marking medium is directed to a recording surface with one charge value, or is intercepted before recording by another charge value at a different level. Jacob's device contemplates recording electronic signals through the use of a marking mist or spray consisting of a jet of air containing ink particles.

10. In 1956, Harold Waage at Princeton University published his observation that a uniform succession of water droplets could be produced, in accordance with the principles of Lord Rayleigh, and that the droplets could then be deflected in an electrostatic

field in a manner analogous to deflection of electrons in a cathode ray tube. The report of Waage's experiments did not suggest a recording use, but only primary observation of the characteristic movements of the droplets under a stroboscope and with mirrors.

11. Between 1956 and 1962, R. H. Magarvey published studies, first with B. W. Taylor and then with B. L. Blackford, in the area of inducing charges on water drops. The Magarvey art concerns induction charging of individual water droplets produced by a vibrated nozzle, and describes a device and experiments which involve the breakup of water from a nozzle and headphone arrangement into a stream of uniformly sized and spaced droplets; an induction ring which charges drops passing through it; a manually varied voltage supply to the induction ring; an electrode for electrostatically deflecting the charged drops as a function of the charge of the drops; and a collector for receiving the charged drops. In the earlier Magarvey studies, in 1956, he deflected charged water droplets in a varying electrostatic field to separate some droplets from others which were intercepted. Magarvey also added blue aniline dye to the water to aid photography of the droplets against a white background. Magarvey did not disclose any printing or recording use for his device.

12. In the late 1950's, Charles R. Winston at Teletype Corporation made an ink jet printer which sold commercially for sev-

eral years as the Teletype Inktronic. U. S. Patent No. 3,060,429 issued to Winston in 1962 based on a disclosure filed in 1958. The Winston printer involved an ink supply under slight fluid pressure, formation of uniform highly charged ink droplets, movement of paper across the path of the ink droplets for marking, deflection of some ink droplets to intercept them and to keep them from marking the paper, and controlled electrostatic deflection of other ink droplets to effect marking at the proper location on the paper. It also included a function generator to vary the strength of the electrostatic field through which the ink drop passes. Variations of the strength of that field caused the drops to deflect varying amounts and to strike the paper in the correct place. The Winston printer did not employ a constant stream of ink droplets formed by fluid pressure; rather, it employed an attractive electrostatic force, located on the opposite side of the paper from the nozzle, to draw the ink droplets from the nozzle whenever ink droplets were desired. Although Teletype Corporation has discontinued sale of the Winston printer, some of the printers are still in use today.

C. *Sweet's Work and Related Activities*

13. Richard G. Sweet is an electrical engineer, conducting electronics research in the laboratories of Stanford University. In 1961, Sweet was given, as a gift, an aquarium equipped with an air stone for putting

oxygen into the water for the fish to breathe. Being a curious scientist, Sweet wondered how oxygen from the air was transferred from the bubbles released into the aquarium to the water, and did some research to find out. That research led Sweet to an old book entitled *Soap Bubbles*, based on lectures given in England in the 1890's by Sir Charles Boys. That book contained a chapter describing how a small fluid jet broke up into uniformly spaced and sized droplets which could be electrostatically deflected. Boys had used a tuning fork to vibrate the nozzle to produce disturbances on the fluid jet and to cause it to break up into the stream of uniform droplets.

14. Sweet was intrigued by Boys' experiments, having in mind:

> "... a rather vague idea that one of the vague applications of this might be some kind of writing device in which the droplets, since they were very small, it might be possible to move them more rapidly than one could move a mechanical system such as those that I was familiar with."

Sweet was familiar with, for example, moving pen recorders of the kind used to make electrocardiograms. Sweet conducted experiments repeating Boys' work.

15. Sweet's initial thought was to apply an intelligence or information signal to a deflection mechanism so that droplets

would be deflected in the same fashion as electrons are deflected in a cathode ray tube. That did not work well, however; because of the slow speed and large mass of inkdrops as compared to electrons, that type of deflection system had a very low frequency response. So Sweet searched his mind for a better way; he testified:

> "And it was at that point that I was searching for some way to get around that limitation, that the idea of actually charging the droplets and having the droplets carrying the information occurred to me."

16. Sweet next undertook to determine the physics of the drop-charging process, a phenomenon not clear to him from Boys' work. Sweet discovered that, unlike Boys who charged and deflected droplets with a single electrode, he could charge the droplets separately from the deflection process by providing a separate electrode to charge the droplets before they were deflected. That convinced Sweet that he had something; in such a device, the frequency response would depend only on the rate at which droplets could be formed. All that was necessary was that the charging electrode be at the desired voltage at the instant the droplet was formed; after the droplet was formed, its charge was "fixed."

17. At that point in early 1961, Sweet assembled "a very crude system" consisting of a nozzle fed with tap water, a miniature

loud speaker to stimulate the nozzle, a charging electrode and a pair of deflection plates, to enable Sweet to study the trajectories of the deflected droplets and to learn how they responded to various signal waveforms applied as charges to the droplets. That system was sketched in Sweet's laboratory notebook in July of 1961.

18. Sweet had kept his group leader, R. C. Cumming of the Stanford Electronics Laboratory, fully apprised of what he had been doing in this research. Cumming expressed interest, and suggested that the two of them approach the Army Signal Corps, with whom Stanford already had a research contract, to see if the Signal Corps would provide financial support for Sweet's project.

19. The contract monitor for that contract, Ira O. Myers of the Army Signal Corps, paid Sweet and Cumming a visit in the month following the date of Sweet's sketch. Sweet showed Myers his crude apparatus, hoping that Myers would give him some encouragement. Myers expressed interest and asked Sweet for a formal proposal. On September 13, 1961, Cumming wrote to Myers, forwarding to him Sweet's written proposal.

20. Myers responded promptly, suggesting that a working model be fabricated for laboratory testing. The project was then formally established, and in early 1962 Sweet began his experimental work under the auspices of the Army Signal Corps.

21. Under the Signal Corps Contract, quarterly technical reports were required concerning the Sweet project.

22. The quarterly reports on the Sweet project were combined each quarter with reports on other projects in a consolidated report, designated a Consolidated Quarterly Status Report ("CQSR"). The first relevant CQSR, namely, report No. 31, was distributed by Stanford University and received prior to July 31, 1962, by the private and governmental organizations, libraries, universities, persons, and other entities listed in its distribution list appearing at the end of the CQSR.

23. The second and third relevant CQSRs, namely reports Nos. 32 and 33, were distributed by Stanford University and received prior to March 25, 1963, by the numerous organizations, libraries, universities, persons, and other entities listed in their respective distribution lists.

24. All of the quarterly reports on the Sweet project were unclassified. Even though the CQSRs were confidential, the individual Sweet quarterly reports all bear the word UNCLASSIFIED with the title.

25. Sweet's project under the Signal Corps Contract was not at any time assigned any Government security classification. While Sweet's work was carried out in a building of the Stanford Electronics Laboratories in which classified research was being carried out, visitors without se-

curity clearance were permitted in the area of Mr. Sweet's work, and Mr. Sweet was free to demonstrate his work to anyone.

26. Sweet's first job in the laboratory, upon obtaining the government contract, was to increase the droplet frequency, that is, the rate at which the droplets issued from the ink nozzle. The prior work of Boys, and other literature references tracked down by Sweet, described liquid jets having droplet frequencies of a few hundred drops per second. Sweet, in contrast, was interested in droplet rates greater than 20,000 per second. Within a very short time, Sweet succeeded in producing 100,000 droplets per second, a rate he found suitable for recording. He made his first record in April of 1962.

27. Sweet's first record was a replication of a sine-wave input signal, a type of signal readily available in the laboratory and commonly used by engineers to evaluate the frequency response of electronic equipment.

28. Annual Contractors and Stanford Technical Advisory Committee (TAC) meetings were held at Stanford University each August during the early 1960's to demonstrate the research products developed at Stanford to those who attended the meetings. Those meetings were attended by members of Stanford's Technical Advisory Committee and by representatives of Government contractors, on an invitation-

only basis. Sweet's laboratory was located in an area secured by guards, to protect the security of classified work which was being conducted there.

29. By the time of the annual Contractors and TAC meetings in August, 1962, Mr. Sweet's recorder had been reduced to practice and he demonstrated a model of the recorder at those meetings. These demonstrations were open to all attendees at the meetings who were interested in seeing it. In addition to the actual demonstration, Mr. Sweet had copies of waveforms posted in the area of his demonstration.

30. There were no constraints of any kind placed upon the attendees at the 1962 Contractors and TAC meetings, as to their subsequent disclosure or use of any information they obtained concerning the Sweet recorder or the Sweet project.

31. Some time after the August, 1962, TAC meeting, Sweet observed that when this input signal was changing rapidly, an error resulted in the charge on one drop of ink. That drop, as a result, would not strike the paper precisely where it was supposed to. Sweet corrected that condition by wiring into his system a standard compensating or tone-control circuit like that employed in audio systems.

32. After the Sweet direct-writing oscillograph had been reduced to practice, and had been demonstrated at the August, 1962, Contractors and TAC meetings, Sweet con-

tacted various industry members to interest them in commercializing his recorder.

33. In October and November, 1962, Sweet sent letters to several manufacturers of recording instruments, for the purpose of finding:

> "... a commercial concern that would do some development of the system to commercialize it and hopefully under some kind of [licensing] arrangement with me."

Such letters were sent to Brush Instruments, Honeywell, and Hewlett-Packard, among others.

34. Sweet ultimately granted an exclusive license to his invention to Honeywell. The Honeywell license obligated Sweet to submit to Honeywell a complete disclosure of his invention. He did so on March 6, 1963.

35. Sweet's disclosure to Honeywell outlined what his invention was and how it worked. He noted that his invention contained the following elements:

(a) A means for supplying ink under pressure;

(b) A "nozzle or orifice" from which the ink issues as a "free jet";

(c) A means "for causing the jet to break up into regularly-spaced droplets of uniform size";

(d) A charging electrode for charging the ink droplets in proportion to the signal to be recorded;

(e) A deflection system to deflect the charged droplets, utilizing "a uniform DC electric field";

(f) A recording device on which the record can be made; and

(g) A transport system to advance the record surface during recording.

36. In his Honeywell report, Sweet noted several "possible modifications and variations" to the basic system. One was a means of diverting from the record surface a portion of the ink issued from the nozzle to control the intensity and width of the recorded trace. Unwanted or excess ink droplets, Sweet noted, could be disposed of by simply deflecting them to a catcher, without their ever reaching the record member. That deflection technique for intensity control was still on the drawing board, however, as Sweet noted that it was a feature which was being tested.

37. In the period following his entering into a contract with Honeywell, Sweet continued to test his system. For example, by March 31, 1963, Sweet had reported tests of his catcher.

D. *The Sweet Patent Applications*

38. Sweet's agreement with Honeywell provided that Honeywell would prepare and file, on Sweet's behalf, patent applications on Sweet's invention. Honeywell's rights were, however, subject to the right of the U.S. Government to receive a royalty-free license.

39. The first Sweet patent application was filed by Honeywell on Sweet's behalf on July 31, 1963. It disclosed the same device, which Sweet had demonstrated at the TAC and Contractors meetings in August of 1962.

40. That first Sweet patent application did not include a disclosure of the concept of, or apparatus for, deflecting ink droplets to a catcher. At the time the first application was filed, that concept was still in the evaluation stage. Later in 1963, Sweet visited Honeywell's facilities in Denver on a regularly-scheduled consultation visit, at which time it was decided that deflection to a catcher was a valuable improvement which should be included in Sweet's patent. A continuation-in-part (CIP) application to that end was filed on March 31, 1964, and the first application was thereupon abandoned in favor of its successor.

41. The second Sweet patent application, Serial No. 354,659, included all of the disclosure of the original application plus some new drawings and descriptive text relating to them. The new disclosure thus added to the CIP application material related to the catcher, its associated circuitry, and its utility in disposing of unwanted ink drops.

42. During the course of the prosecution of the Sweet CIP application, the Patent Office examiner cited a number of prior-art references, many of which are relied upon

by Mead. After a lengthy prosecution, the Patent Office allowed the Sweet CIP application, and it issued on July 27, 1971, as U. S. Patent No. 3,596,275.

43. Although Sweet knew of Waage's work (Finding of Fact # 10, page 6, *supra*) as early as 1962, he did not cite it to the patent office during the prosecution of his application. Sweet wrote to his attorney in 1970 that he considered the Waage publication to be the "closest prior art" in the field of drop generation for purposes other than writing or recording.

44. Mr. Sweet testified that he knew during the development of his device that it was "critical" that ink having the correct properties be used in the device in order to achieve proper operation. However, he further testified that he had found that every ink he had used "that would squirt through the nozzle worked satisfactorily." There was no disclosure regarding ink properties in either the first or the second Sweet patent applications.

45. Mr. Sweet also testified that his "best system" prior to the filing of his first patent application included a compensating network for drop-placement error. (See Finding of Fact # 31, page 12, *supra*). However, he further testified that he thought the compensating circuit "usually was not needed." There was no disclosure regarding ink properties in either the first or the second Sweet patent applications.

46. Sweet's license to Honeywell had continued as an exclusive license until September, 1965, when Honeywell converted it to a non-exclusive license. On September 9, 1969, Honeywell terminated its non-exclusive license.

47. A. B. Dick had first become a licensee of the Sweet invention in May, 1966. Thereafter, on September 19, 1972, A. B. Dick bought Sweet's patent outright, subject to other licenses earlier granted.

E. *The Sweet Patent*

48. A waveform is the pictorial representation of the form or shape of a wave with respect to time.

49. The Sweet patent describes a recording system in which the waveform of an incoming electrical signal is recorded on paper.

50. The waveform is recorded, in accordance with the Sweet patent disclosures, by the imprint of uncharged and variably charged ink droplets on various positions on a paper. In every embodiment disclosed in the Sweet patent, the waveform of a continuously varying signal is recorded by a process which involves: charging each ink droplet in a succession of droplets in proportion to the instantaneous value, including zero, of an electric signal which varies as a function of time; and then passing the variably charged droplets through a constant

deflection field to deflect the droplets through variable trajectories in order to produce on the paper a trace of the incoming waveform.

51. As defined by the McGraw-Hill Encyclopedia of Science and Technology, an oscillograph is:

> A measurement device for determining waveform by recording the instantaneous values of a quantity such as voltage, as a function of time. It consists of three major components: (1) a primary detector for sensing the instantaneous values of the quantity, (2) the timing system for introducing a time scale on the record, and (3) some means for recording the waveform.

52. The testimony at trial was consistent that the Sweet patent discloses only an oscillographic device.

53. Richard G. Sweet, the inventor of the patent, testified:

> Q. Sir, isn't it true that the only direct writing recorder disclosed in your patent is an oscillograph?
>
> A. As we defined it, yes.

54. Dr. Joseph M. Crowley, an expert witness called by A. B. Dick, testified:

> Q. Is there anything disclosed in the Sweet patent which shows anything other than an oscillograph?
>
> A. I don't recall anything.

55. Mr. Lockwood Burton, the attorney who drafted the Sweet patent, testified:

Q. Did you consider that Mr. Sweet had developed an invention in the field of oscillography?

A. Yes.

Q. In any other field?

A. No other field was concerned.

56. Dr. Charles Hendricks, an expert witness called by Mead, testified:

Q. Does the Sweet patent disclose an oscillograph?

A. Yes, it does.

Q. Does it disclose any other kind of device?

A. No.

57. The Sweet patent discloses a direct writing oscillograph for directly recording on paper a picture of the waveform of an electrical signal as a function of time. The Sweet patented device reproduces an apparently cursive waveform of the incoming signal. It is not capable of printing pictures of something other than a waveform.

58. In the Sweet patent, interception and collection of some of the droplets by deflection to a catcher serves only the purpose of controlling intensity of the trace to prevent puddling associated with excess ink when the paper is moving slowly or where the waveform is not changing quickly. Under such circumstances, a cursive representation of the incoming signal or waveform

is still recorded; the cursive trace on paper is a cleaner representation of the incoming signal due to the elimination of puddling.

Technically, the apparently cursive waveform produced by the Sweet device is discontinuous, in that it is composed of discrete droplet imprints rather than a continuous stream. However, the waveform produced by the Sweet device appears continuous by virtue of the overlapping or close juxtaposition of the droplet imprints. The interception facility in the patented Sweet device does not serve the purpose of creating an apparent discontinuity in any portion of the waveform, but only to adjust the density of the waveform by increasing the distance between droplet imprints.

59. The Sweet patent discloses deflection of the charged drops in a direction transverse to the time axis of the trace, which ordinarily is transverse with respect to the direction of relative movement between the paper and the nozzle. Such transverse deflection is essential in order to operate the device of the Sweet patent to record a waveform on paper. Sweet does not disclose, or illustrate in any embodiment, a deflection of the drops other than in this direction. Deflection of the charged drops longitudinally with respect to the relative movement between the paper and the nozzle in the oscillograph disclosed by Sweet would produce an inoperative device.

60. Certain embodiments in the Sweet patent do disclose deflection of charged

drops longitudinally with respect to the relative movement between the paper and the device as a whole. However, in each such embodiment, the nozzle rotates and the direction of the deflection remains substantially transverse the time axis of the trace, which is substantially transverse of the direction of relative movement between the nozzle and the paper.

61. Claims 1 and 33 of the Sweet patent are the only claims of that patent asserted against Mead in this case. Both claims describe charging each droplet in a single file succession, with the magnitude of each charge being proportional to the instantaneous value of an electric signal which varies as a function of time, and deflecting the droplets to take different trajectories as a function of the magnitude of charge associated with the droplet so that the droplets form a trace characteristic of the variable input signal on the recording surface. This description refers to oscillographic recording and is consistent with the overall disclosure of the Sweet patent.

62. Claim 1 specifically requires that charged drops be deflected "laterally." This term is ambiguous since alone it may mean deflection "lateral" of the undisturbed stream of droplets emitting from the nozzle, including deflection longitudinal of the relative movement between the nozzle and the paper, *or* it may only mean deflection "lateral" of the relative movement between the nozzle and the paper.

63. Claim 33 requires deflection of charged droplets along different "trajectories" for collection in different "regions" of the collecting device. This claim is ambiguous in the same manner as claim 1.

64. The Sweet patent only discloses deflection of charged droplets in a direction transverse of the direction of relative movement between the paper and the nozzle, and both claims must be read in light of this limited disclosure. Deflection of ink droplets in a direction longitudinal of the direction of relative movement between the paper and nozzle would cause the device disclosed in the Sweet patent to be inoperative.

65. Claims 1 and 33 of the Sweet patent describe an oscillographic method and recorder.

66. The construction of the Sweet patent and its claims as limited to oscillography is also consistent with the history of prosecution before the Patent Office of the 1964 application which became the Sweet patent.

67. In examining the Sweet application on July 31, 1970, the Examiner rejected applications claims 30 and 51, which became respectively claims 33 and 1 of the Sweet patent, as being "fully met" by the Magarvey and Blackford study. (See Finding of Fact # 11, page 6, *supra*). It was the position of the Examiner that the Magar-

vey and Blackford publication taught each feature of claims 30 and 51 of the Sweet application.

68. In response to the rejection of the claims as fully met by Magarvey and Blackford, Sweet amended the claims to include the word "variable" with respect to the electrical signal values. The claims then read as they now read in the Sweet patent "applying variable electrical signal values representative of the desired deflections to the charging electrode whereby individual droplets are electrostatically charged . . . ." The claims were further amended to recite that the droplets which have different charges move through different trajectories.

69. As indicated in Finding of Fact # 11, above, none of Magarvey's publications taught a printing or recording use for his droplet deflection device. Sweet pointed this out to the patent office examiner. However, in doing so, Sweet made the following representation to the patent office "for clarification and to place the case in condition for immediate allowance":

> Obviously the Magarvey and Blackford publication does not teach the concept of a high speed jet recorder or printer in which droplets are first electrostatically charged in accordance with the instantaneous values of a varying signal and thereafter individually *deflected by varying amounts* dependent upon said signal

by projecting the charged droplets through a fixed electrostatic field. Lastly, it does not in any way anticipate the concept just described as applied *to deposit the deflected droplets on a record medium to produce a pattern or design characteristic of the signal variations.*

70. Mr. Adelman, an expert witness called by Mead, testified in regard to the position taken by Sweet to gain allowance of his patent:

A. Taking those remarks in the context of the specific amendment and viewing the Magarvey reference, it is my opinion that when the language is so read, one must conclude that in the Patent Office, Mr. Sweet was by virtue of the rejection limiting the scope of his claims to an oscillograph.

71. It is clear that through such characterizations of Magarvey and Blackford and through the amendments to the claims which Sweet made in response to the rejection of the claims as fully met by Magarvey and Blackford, Sweet limited his invention to oscillography in which a picture of the incoming waveform is reproduced on paper by recording as a function of time the magnitude of deflection of each droplet in a succession so that the succession of deflected droplets trace the waveform on paper. This is the function and operation of an oscillograph.

F. *Lewis' and Brown's Work*

72. Maurine Hartley, of Brush Instruments, responded to one of Sweet's letters regarding commercialization of his oscillograph in late 1962. Hartley visited Sweet at Stanford. Upon his return to Brush, Hartley discussed Sweet's device with his assistant, Arling Dix Brown.

73. Within a very short time, Brown and his colleague Arthur M. Lewis began working on a drop writer. They subsequently undertook development work on a machine which would utilize Sweet's inventive concepts to print alphanumeric characters.

74. The original Lewis-Brown machine, which was first tested in July, 1963, utilized a "character generator" which included storage means for letters and numerals and a mechanism for generating distinctive voltage signals corresponding to the letters and numerals. A pre-determined sequence of characters and numerals (i. e., a message) was programmed on a disk and then the disk was scanned optically to convert the optical signals into electrical signals for printing the message stored on the disk. That character printer could be operated at 1200 to 2400 characters per second.

75. The character printer used in July, 1963, at Brush did not physically incorporate an interceptor or catcher for collecting unwanted or excess ink droplets. Instead, such droplets were simply deflected to a

"dump line" which appeared as an underscoring of the printed message.

76. That same printer was demonstrated to A.B. Dick in February of 1964. During that demonstration, Lewis and his colleagues at Brush employed, for the first time, a collector to receive the unwanted ink drops.

G. *The Lewis and Brown Patent Applications*

77. The first Lewis-Brown application was filed on September 25, 1964. That application, No. 399,291, included a description of the Lewis-Brown character printer, which included a nozzle and a means to vibrate the nozzle to produce a succession of uniformly-sized and uniformly-spaced ink droplets. Each droplet, as it was formed, was given an electrical charge characteristic of a predetermined character such that, when the varying-charge droplets were passed between a pair of constant-voltage deflection plates, the droplets were subjected to varying deflections to print the letter or numeral selected. (Lewis and Brown had recognized that the character generator could be a purely electronic device, as opposed to the electro-mechanical version they had tested in their laboratories. They accordingly described in their patent application such an all-electronic function generator.) Ink droplets not needed for printing were, as in the Sweet device, deflected to a catcher.

78. A second Lewis-Brown patent application was filed a few months later; it was Serial No. 425,162, filed January 13, 1965, and it contained essentially the same disclosure as the earlier one.

79. On July 12, 1965, Lewis and Brown filed the last of their applications, Serial No. 471,259. That application contained the same disclosure as the earlier applications, plus description in greater detail of the electronics for controlling the function generator.

80. The prosecution of the final Lewis-Brown application was very brief, the Patent Examiner having allowed on the first Office Action all of the claims as they were presented. Four prior-art references were cited, including an earlier publication by Sweet describing his invention and the use, in conjunction therewith, of a sine-wave generator.

81. The Lewis-Brown patent issued on January 10, 1967, and A. B. Dick became and is the exclusive licensee under it.

H. *The Lewis-Brown Patent*

82. The Lewis-Brown patent discloses a device for printing predetermined characters by using a function generator to control the signals applied to the Sweet device. The only function generator disclosed produces an analog staircase waveform capable of deflecting ink droplets to many different

locations to print an alphanumeric character. The patent refers to prior art Patent No. 2,958,828 as providing a suitable function generator.

83. The Lewis-Brown patent, like the Sweet oscillograph, only discloses deflections of the ink droplets which print in a direction transverse of the time axis of relative movement between the ink jet and the paper. It is disclosed that droplets are deflected to many locations transverse of the time axis, with seven different transverse printing locations being disclosed in the patent.

84. The Lewis-Brown patent defines "the word character or characters ... to include ... nonalphanumeric designs such as waveforms and various geometric configurations."

85. Claim 2 of the Lewis-Brown patent, the only claim alleged against Mead by A.B. Dick and Gould, requires signals representative of "predetermined characters" for charging the succession of droplets so that droplets are deflected in accordance with the signals to produce characters on a record from a single nozzle.

86. Without deflection, or with deflection longitudinal of the relative movement of the paper and a single nozzle, the Lewis and Brown device is incapable of producing more than one "character," being a straight-line waveform. In order to be ca-

pable of producing alphanumeric designs, geometric configurations, or common nonlinear waveforms, as required by claim 2, the Lewis and Brown device requires deflection *lateral* of the direction of the relative movement between the paper and a single nozzle, much like the Sweet patent.

87. The Lewis-Brown patent claims a method for generating a multiplicity of characters by use of a single nozzle.

I. *The Interference Proceeding*

88. After the Lewis-Brown patent issued in January, 1967 (while Sweet's application was pending), Sweet copied claims from it, provoking an interference proceeding between Lewis-Brown and himself to determine the priority of invention. A lengthy interference proceeding ensued, but the Patent Office Board of Interferences found that Sweet did not disclose a function generator and hence could not claim it in combination with his drop-writing apparatus.

89. The Board of Interferences, in rendering the decision, adopted the position taken by Lewis and Brown relative to the scope of the Sweet application as follows:

> Sweet's system records a cursive line representative of the voltage of an unknown, incoming waveform. A "picture" of the waveform appears on a moving strip of paper . . . It writes a continuous line, a cursive line, the length depending upon the length of the incoming signal.

J. *Sweet and Cummings Work and Patent; Mead's Interest*

90. While Sweet and his supervisor Cumming were still working under the Signal Corps contract, they jointly conceived an ink-jet printer utilizing an array of jets arranged side by side in tandem.

91. The Sweet and Cumming device included two embodiments. The first, conceived on May 20, 1963, was for a facsimile recorder in which the input signal to the charging electrodes of the device would produce the desired image, such as a television video signal. That machine was not capable of printing predetermined characters, but could only print characters represented by the original signal fed to it.

92. A second embodiment of the Sweet and Cumming device was conceived later, on September 12, 1963. That machine included a character generator which enabled the Sweet-Cumming device to print predetermined characters.

93. Sweet and Cumming proposed that Stanford's laboratory undertake development of their idea. Stanford's laboratory director, however, rejected it.

94. Like the Sweet application filed earlier, the application covering the Sweet and Cumming device was filed by Honeywell, acting on behalf of Sweet and Cumming. The first Sweet-Cumming application was filed on March 25, 1964, as Serial No. 354–

721; it was later supplanted by continuation-in-part application No. 660,163, filed August 1, 1967. As issued, the Sweet-Cumming patent (No. 3,373,437) disclosed both embodiments conceived by Sweet and Cumming in May and September of 1963, respectively. Neither of them was ever actually built by either Sweet and Cumming or by Stanford.

95. On the face of their patent, Sweet and Cumming acknowledged an indebtedness to Sweet's prior work stating:

> "The present apparatus and method makes use of the invention disclosed in said copending application S.N. 354,659, particularly in that fluid droplets from a jet nozzle are electrostatically deflected in accordance with signal values by electrostatically charging the droplets in accordance with instantaneous signal values and then causing the charged droplets to be deflected by passing them through a substantially constant electrostatic field, the droplets being either deposited on a record medium or deflected to droplet intercepting means."

96. However, the ink jet devices of Sweet and of Sweet and Cumming achieve different results. In Sweet, one is attempting to replicate on paper the incoming waveform using a single jet; in Sweet and Cumming, the multiple jets in combination do not replicate on paper the incoming sig-

nal or waveform, but rather create visual information which is not characteristic of the waveform.

97. The Sweet and Sweet and Cumming devices also operate in a different way and utilize a different combination of parts. Where Sweet utilizes a single nozzle with deflection of the variously charged droplets laterally with respect to the relative movement of the paper and nozzle so as to replicate on paper the incoming waveform, Sweet and Cumming utilize two levels of charge and the cooperation of closely spaced jets to convey information. In Sweet and Cumming, uncharged drops which are used for printing pass through the deflection field undeflected to mark the paper, and the droplets which are charged are deflected to a catcher and prevented from reaching the paper. In Sweet and Cumming, deflection of those droplets to the catcher is longitudinal with respect to the relative movement of the paper and nozzle, and the catcher is parallel to the row of jets and extends across the pages.

98. The Sweet and Cumming printing system is not the equivalent of the Sweet oscillograph. Although the Sweet and Cumming printer uses some of the scientific principles involved in Sweet's oscillograph (which Sweet and Cumming described in their patent as Sweet's "invention"), Sweet himself stated:

The concepts in our facsimile and printing ideas are not applicable to oscillographic recording systems. They do, however, involve ink jets with drop formation and electrostatic charging processes similar to those used in my oscillograph. The situation seems analagous to the case of microwave vacuum tubes which differ widely in configuration and application, but which have similar electron guns.

99. A. B. Dick and Mead now jointly own the Sweet-Cumming patent, A. B. Dick having purchased Sweet's interest and Mead having purchased Cumming's interest.

100. Mead began its development effort in ink jet printing, which culminated in the development of the DIJIT printer (the accused device), in earnest, in April, 1967, with the assistance of personnel of Battelle Memorial Institute in Columbus, Ohio.

101. Mead's efforts toward an ink jet printing system involved placement of a multitude of ink drops on a page to form a visually perceptible image of something other than a waveform. Mead envisioned an array of orifices across a page, or other printing surface, from which ink droplets would issue at high rates of speed as the page moved past the array. Selective interception of droplets which are not desired to mark the page to form the image would be effected by a switching operation in which each droplet not to be recorded would be

electrically charged and deflected to an ink catcher.

102. Shortly after the issuance of the Sweet-Cumming patent in March, 1968, Mead began the negotiations which resulted in its purchase of Dr. Cumming's interest in that patent. Mead became interested in the Sweet-Cumming patent because it involved the concept under development by Mead wherein an array of orifices forming ink jets are utilized to print alpha-numerics and graphics by selectively intercepting droplets to form an image.

K. *The Mead DIJIT Printer*

103. The Mead DIJIT printer utilizes a multiple array concept for printing in which the droplets used for printing issue simultaneously from a plurality of orifices. The droplets which print are essentially uncharged and undeflected in the Mead system. The DIJIT printer has a printhead disposed above and extended across the paper to be printed. This printhead includes an ink manifold and an orifice place which contains about 100–120 orifices per inch from which ink jets issue. A piezoelectric stimulating element is in physical contact with the orifice plate to vibrate the plate and to cause ink issuing from each jet to form a succession of uniformly sized and uniformly spaced ink droplets. Each orifice of the multiple array of orifices is thereby capable of producing ink drops at a rate of about 50,000 per second.

104. In the DIJIT printer, each droplet issuing from each orifice passes a charging electrode located in a charge tunnel positioned below the orifice plate. There an electric voltage charges each droplet to a standard charge value to effect interception unless a computer commands the absence of such voltage and grounds the charging electrode to avoid all but a minimal charge on the droplet. The droplets emerging from the charge tunnels then pass between a catcher and a deflection ribbon which are disposed below and on either side of the array of orifices. The catcher and deflection ribbon are maintained at a constant electrostatic potential. This arrangement of the catcher and deflection ribbon creates an electrostatic field. The droplets emerging from the orifices which have been charged to the standard charge value as they pass through the charge tunnel are deflected by the electrostatic field to the catcher, and thus do not mark the paper. The droplets which are not so charged to the standard value fall between the catcher and the deflection ribbon and mark the printing paper.

105. Each intercepted droplet in the DIJIT printer is deflected to a catch position in a substantially longitudinal direction with respect to the relative movement between the paper and the printhead. The DIJIT printer cannot operate if droplets deflect in a direction transverse of the rela-

tive movement between the paper and the printhead. The DIJIT printer provides no means for accomplishing such deflection.

106. In one sense, a single orifice on the Mead DIJIT is capable of producing one waveform. A single orifice operating without signal disturbance traces a line characteristic of the lack of disturbance. A line is a waveform. Moreover, a single orifice is capable of producing a linear waveform with periodic discontinuities. However, each orifice is incapable of producing a continuous waveform characteristic of a variable signal, and each orifice is incapable of producing common alphanumeric or geometric configurations.

107. The DIJIT printer achieves its desired function only through the combined results of the multiple orifices acting in cooperation with each other. Each single jet alone achieves no useful result. The DIJIT printer does not seek to trace on paper the incoming signal to a charge tunnel or tunnels; rather, the ink droplets, through the collective arrangement of the orifices and coordinated interception of droplets, create a composite picture unlike the incoming signals. The final picture is alphanumeric or graphic information which is not characteristic of the charging signals to the charging tunnels.

108. This concept of printing by directing a multitude of ink droplets toward a page, and selectively intercepting some of

the droplets to form the image on the page, has been embodied in every commercialized Mead ink jet printing system.

L. *The Events Leading up to this Litigation*

109. Ten days after the issuance of the Sweet patent on August 6, 1971, A.B. Dick notified Mead that application of the Sweet and Cumming array technology in connection with Mead's ink jet activities would infringe the Sweet patent.

110. Mead responded on August 17, 1971, stating that its plans for commercial activities in the "ink-jet printing area are not yet firm" but that, in any event, Mead did not believe activities based on the Sweet and Cumming array technology would infringe the Sweet patent.

111. Nothing more was heard from A. B. Dick about the Sweet patent until April, 1972, when A. B. Dick contacted Mead by telephone again asserting A. B. Dick's position that Mead could not practice the technology of Sweet and Cumming in its activities with respect to the Mead DIJIT ink jet printer without infringing the Sweet patent. By letter of May 5, 1972, Mead promptly replied to A. B. Dick setting forth in detail the noninfringement position of Mead, including a detailed discussion of the differences between the Sweet oscillographic apparatus and method and the binary, on-off operation of the Mead DIJIT system.

112. After May, 1972, between several extended delays, the parties periodically exchanged correspondence and met to discuss the same matter.

113. In September, 1973, the commercial Mead DIJIT printer won the IR 100 award of Industrial Research Magazine recognizing the 100 most significant commercial developments of the year.

114. In the same year, Mead began to sell printing service using a DIJIT system prototype.

115. Mead first offered a DIJIT printer for sale in 1975.

116. Mead's DIJIT system proved unprofitable through 1975 or 1976. By the middle of 1974, Mead had spent about six million dollars in research and development on DIJIT; the budget for 1974 was one million six hundred thousand dollars. The current budget generally runs to ten million dollars. Mead employs some 285 employees in the Dayton area in connection with the Mead's ink jet printing systems.

117. A. B. Dick commenced its suit against Mead on June 8, 1978. Between 1975 and 1978, Mead had contemplated but abandoned the idea of acquiring A. B. Dick. A. B. Dick's property interest in the Sweet, Lewis-Brown and Sweet-Cumming patents were considered by Mead when deciding whether to acquire A. B. Dick.

M. *Findings on Specific Issues*

1. *Laches*

118. A. B. Dick first became aware of the possibility that Mead might infringe on the Sweet patent approximately six years and ten months before it commenced infringement litigation. However, at the time of A. B. Dick's first awareness, the activities by Mead which A. B. Dick thought might infringe were "not yet firm."

119. A. B. Dick was apprised of Mead's position that DIJIT's development would not infringe on the Sweet patent, and an extensive articulation of Mead's reasons, therefor, approximately six years and one month before it commenced infringement litigation.

120. Mead's first commercial utilization of a prototype DIJIT system occurred approximately five years and six months before A. B. Dick commenced infringement litigation. Mead's utilization at this time was quite limited and unprofitable.

121. The prospect of profit by Mead in commercial utilization of the DIJIT system did not materialize until around 1975, approximately three years before A. B. Dick commenced infringement litigation.

122. Mead's contemplated acquisition of A. B. Dick after 1975 provides no reasonable excuse for A. B. Dick's failure to commence infringement litigation before 1978.

However, given the initial uncertainty of Mead's plans in the ink-jet printing field, and given the uncertain commercial future of the DIJIT system during much of the time preceding 1978, it cannot be said that A. B. Dick's delay in filing suit, of as much as six years and ten months, was, under the circumstances, unreasonable.

2. *DIJIT's Infringement of Sweet*

123. Each orifice in the DIJIT printer, and, as a result, the DIJIT system as a whole, *literally infringe* claim 1 or claim 33 of the Sweet patent, *if* "lateral" deflection in claim 1 is interpreted to include deflection *longitudinal* of the relative movement between the record member and the nozzle, *or* if deflection in multiple "trajectories" to multiple "regions" in claim 33 is interpreted to include deflection in that same direction.

124. Each orifice in the DIJIT printer *does not literally infringe* claim 1 or claim 33 of the Sweet patent *if* said claims are interpreted to describe *only* deflection transverse of the time-axis of relative movement between the record member and nozzle, and thus define only oscillography.

125. If the DIJIT printer does not literally infringe claim 1 or claim 33 of the Sweet patent, as interpreted in the preceding paragraph, it does not infringe as an equivalent of the Sweet invention as claimed. Each orifice in the DIJIT printer, as well as the combined operation of the

array of orifices in the DIJIT printhead, do not perform substantially the same function in substantially the same manner to produce substantially the same result as claimed in the Sweet invention.

3. *DIJIT's Infringement of Lewis-Brown*

126. The DIJIT printer does not literally infringe claim 2 of the Lewis-Brown patent, or infringe same as an equivalent of the invention claimed, therein. No single orifice in the DIJIT printer produces multiple "characters" or is capable of producing multiple "characters" as the term is defined in the Lewis-Brown patent. Each orifice in the DIJIT printer, as well as the combined operation of the array of orifices in the DIJIT printhead, do not perform substantially the same function in substantially the same manner to produce substantially the same result as claimed in the Lewis-Brown invention.

4. *Matters Related to the Validity of the Sweet Patent*

127. The Sweet patent and neither of the applications, therefor, made disclosure regarding the specific properties of the ink to be used in Sweet's device, or regarding the use of a compensation network for drop placement error.

128. Sweet believed that the properties of the ink to be used were critical to the device's proper operation, but he also found

that every ink which he had used, which could be passed through the nozzle, worked well.

129. There is no evidence that Sweet contemplated a specific ink or writing fluid with specific properties which would result in a best mode of operation at any time during the prosecution of his patent. Sweet's failure to disclose specific properties of ink critical to proper operation of the device does not constitute failure to disclose the best mode contemplated by him for practicing his invention.

130. Sweet testified that he had used a compensation network in connection with his "best system." Sweet did not state whether he thought that the compensation network was essential to the "best system." On the contrary, because the compensation network only corrected drop placement when the signal voltage varied substantially in a short period of time, Sweet thought that the network "usually" was not necessary.

131. It is unclear whether the compensation network was contemplated by Sweet as a necessary part of the best mode for practicing his invention or whether, on the other hand, the network was thought an advantageous means for practicing his invention under limited circumstances but, cost and other factors considered, was not necessarily advantageous under ordinary circum-

stances. Sweet's failure to disclose the use of a compensation network in conjunction with the operation of his device does not constitute failure to disclose the best mode contemplated by him for practicing his invention.

132. Sweet did not disclose the use of a catcher for intercepting droplets, as an intensity control, in the first patent application, filed on July 31, 1963. Disclosure of a catcher in the practice of his invention was made in the second patent application, filed on March 25, 1964, and was included in the patent as issued.

133. Sweet contemplated the use of a catcher "very early" in the development of his invention and had conducted experiments using a catcher prior to his first patent application. However, Sweet testified that at the time the first patent application was filed, the catcher "was still very experimental in that I had just completed it and had really had no chance to assess its practicality or its reliability." At the time of the first application, Sweet was not certain that the catcher was a necessary part of the best mode of practicing his invention "in light of its complexity." Sweet's failure to disclose the use of the catcher in the operation of his device in his first patent application, filed on July 31, 1963, does not constitute a failure to disclose the best mode contemplated by Sweet for practicing his invention at that time.

134. Because Sweet did not fail to disclose the best mode contemplated by him for practicing his invention in the first patent application filed on July 31, 1963, Sweet's patent is entitled to an effective filing date of July 31, 1963.

135. Because the effective filing date of the Sweet patent is July 31, 1963, potential public uses (e. g., during the August, 1962, TAC and Contractor meetings), potential placements on sale (e. g., by Sweet's letters after August, 1962), potential descriptions in printed publications (e. g., CQSRs 32 and 33, distributed some time prior to March, 1963), and other activities with respect to Sweet's invention after July 31, 1962, are not significant.

136. CQSR 31 contained an unclassified description of Sweet's invention. CQSR 31 was distributed, as a confidential document prior to July 31, 1962, to a select number of persons and organizations interested in the field of ink jet printing and related technologies.

137. Although the description of Sweet's invention in CQSR 31 was unclassified, it is not clear that its distribution to selected persons and organizations under confidential cover rendered the descriptions accessible to a substantial portion of the class of persons skilled or interested in the art of ink jet printing. CQSR 31 was not a printed publication. CQSR 31 does not constitute a description more than one year prior to the effective application date.

138. Sweet did not disclose Waage's work to the patent office during the prosecution of his patent applications. Although Sweet thought that Waage was the "closest prior art," at least by 1970, he thought this was so only in relation to the art of drop generation for purposes other than writing or recording.

139. Waage did not teach a recording use for his device. Moreover, Waage did not teach variable deflection of selectively charged droplets in a constant or uniform deflection field. To the extent that Waage did disclose deflection for purposes of observing the physics of drop movement, Waage was more remote, or cumulative to other prior art references ultimately known to the patent office prior to the issuance of the Sweet patent, such as Magarvey's studies.

140. Sweet's failure to disclose Waage's work to the patent office during the prosecution of his patent applications did not violate the duty of candor to the patent office.

141. None of Mead's prior art references disclose a device for permanently recording variable electronic signals by constant field deflection of selectively charged discrete ink droplets projected toward a recording medium. A device such as this was not known in the art prior to Sweet's work.

142. The fact that the basic elements of such device had been known in the art for

at least 30 years prior to Sweet's work (i. e., Rayleigh's study of drop formation phenomenon in conjunction with Schroter's disclosure of a variably charged ink jet for recording purposes), but that the device had not been reduced to practice until Sweet's work, is indicative that such a device was not obvious to a person of ordinary skill in the art prior to Sweet's work. Magarvey's repeated disclosures of a discrete droplet charge system beginning more than five years before Sweet's work, and the absence of a recording purpose for same until Sweet's work, lends support to this conclusion.

143. Sweet's patent claims invention of means for practicing one of the number of devices for the purpose of oscillographic recording. As such, the claimed invention was not known in the art prior to Sweet's work, and would not have been obvious to a person of ordinary skill in the art prior to that time.

5. *Matters Relating to the Validity of the Lewis-Brown Patent*

144. Sweet's use of a sine-wave generator in conjunction with the practice of his invention was disclosed to the patent office in the course of Lewis' and Brown's prosecution of their patent applications. Lewis and Brown did not violate the duty of candor to the patent office in this respect.

145. The Lewis-Brown patent defines "character" or "characters" to include waveforms. This definition, in conjunction with claim 2 of the Lewis-Brown patent, defines Sweet's prior work using a sine-wave generator in conjunction with his oscillographic recorder, with the exception of possible minor improvement in the type of transducer applied to stimulate drop formation. Lewis and Brown did not invent the use of Sweet's device in conjunction with a sine-wave generator.

146. Sweet did not use a catcher to effect discontinuous drop placement, and did not practice his invention to produce discontinuous characters as otherwise defined in the Lewis-Brown patent (i. e., alphanumerics and geometric configurations). The art prior to Lewis and Brown discloses no device employing Sweet's invention in conjunction with an alphanumeric or geometric character generator to produce alphanumeric or geometric characters.

147. However, the use of character generators other than sine-wave generators, in connection with ink drop printing, was known in the art prior to Lewis' and Brown's work. For example, the Winston patent, which was employed commercially as the Teletype Inktronic, discloses the application of a "control device" to "character-delineating electrodes" in order to produce a "predetermined pattern." Moreover, the Lewis-Brown patent in itself states:

Appendix A

The technique of providing sets of digital pulses which are characteristic of predetermined characters is well-known to those familiar with the art, and therefore need not be described in detail.

148. That the use of character generators other than sine-wave generators in connection with ink drop printing was known in the art prior to Lewis' and Brown's work; that Sweet had used a sine-wave generator, which is a kind of character generator, in conjunction with his invention; and that Lewis and Brown reduced to practice the use of a character generator, other than a sine-wave generator in connection with Sweet's invention within the year after learning of Sweet's work, are all indicative that the use of a character generator, other than a sine-wave generator in connection with Sweet's invention, would have been obvious to a person of ordinary skill in the art at the time of Lewis' and Brown's work.

IV.

Conclusions of Law

A. *Laches*

[5, 6] 149. A defendant in an infringement suit who asserts the defense of laches has the burden of proving an unreasonable delay by the plaintiff in filing suit after the first notice of infringement. However, the defendant is aided in carrying this burden

by a presumption which is derived from the statutory period of recoverable damages found in 35 U.S.C. § 286. The presumption holds that a delay in filing suit longer than six years after the notice of infringement is unreasonable and prejudicial. Under such circumstances, the plaintiff will be barred by laches unless he can: (1) rebut the presumption of unreasonableness in the delay by showing a good excuse, therefor; (2) rebut the presumption of prejudice; or (3) show such egregious conduct on the defendants' part that the equities otherwise weigh in plaintiffs' favor. *TWM Mfg. Co. v. Dura Corp.*, 592 F.2d 346, 348–49 (6th Cir. 1979).

[7] 150. As indicated above (para. 122), the Court is satisfied that Mead's own initially uncertain plans in development of the DIJIT printer, and the commercial uncertainty of DIJIT for an extended period thereafter, are sufficient findings upon which to base a conclusion that A. B. Dick's delay in filing suit, in excess of six years, was not unreasonable as a matter of fact under the circumstances. A. B. Dick is, therefore, not precluded from prosecuting this infringement action by reason of laches.

B. *The Infringement Issues*

151.

In determining whether an accused device or composition infringes a valid pat-

ent, resort must be had in the first instance to the words of the claim. If accused matter falls *clearly* within the claim, infringement is made out and that is the end of it.

Graver Tank & Mfg. Co. v. Linde Air Products, 339 U.S. 605, 607, 70 S.Ct. 854, 855, 94 L.Ed. 1097 (1950) (emphasis added).

[8, 9] 152. However, where the claims in a patent are ambiguous, the claims "must be read in the light of the invention disclosed and cannot be given a construction broader than the teachings of the patent as shown by the drawings and specification." *FMC Corp. v. F. E. Myers & Bros. Co.*, 384 F.2d 4, 13 (6th Cir. 1967); *United States v. Adams*, 383 U.S. 39, 49, 86 S.Ct. 708, 713, 15 L.Ed.2d 572 (1966); *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 217, 61 S.Ct. 235, 238, 85 L.Ed. 132 (1940). Since the Sweet patent discloses only oscillographic recording, the scope of its claims is limited to oscillographic recording. The Lewis and Brown patent claims are limited in scope to the only operation disclosed which requires printing of characters with charged droplets that are deflected transverse to the relative movement between the paper and nozzle.

[10] 153. Based on representations made to the Patent Office and amendments made to the claims in order to obtain the patent, A. B. Dick is estopped to construe the claims of the Sweet patent to claim other than an oscillographic recorder. *Kai-*

ser Industries Corp. v. McLouth Steel Corp., 400 F.2d 36 (6th Cir. 1968), *cert. denied*, 393 U.S. 1119, 89 S.Ct. 992, 22 L.Ed.2d 124 (1969). A "patent must be judged by what is claimed for it in the patent application—not by what is asserted in subsequent litigation." *Philips Industries v. State Stove & Mfg. Co.*, 522 F.2d 1137, 1140 (6th Cir. 1975), citing *Ohio Citizens Trust Co. v. Lear Jet Corp.*, 403 F.2d 956, 958 (10th Cir. 1968), *cert. denied*, 394 U.S. 960, 89 S.Ct. 1308, 22 L.Ed.2d 561 (1969).

[11, 12] 154. The DIJIT printer does not literally infringe on claims 1 or 33 of the Sweet patent or on claim 2 of the Lewis-Brown patent, as said claims are properly interpreted.

[13] 155. An accused device may be found to infringe on a patent, if not literally, as an equivalent of the claimed invention if the accused device "performs substantially the same function in substantially the same way to obtain the same result." *Graver, supra*, at 608, 70 S.Ct. at 856.

156. Mead's DIJIT printer does not infringe the Sweet patent because the DIJIT printer performs a function substantially different from that of the Sweet recording oscillograph and operates in a substantially different way to accomplish a substantially different result. Mead's DIJIT printer does not infringe the Lewis and Brown patent because the DIJIT printer performs a function substantially different from that of the

character printer disclosed in the Lewis and Brown patent and operates in a substantially different way to accomplish a substantially different result. *Dunlop Co. v. Kelsey-Hayes Co.*, 484 F.2d 407 (6th Cir. 1973), *cert. denied*, 415 U.S. 917, 94 S.Ct. 1414, 39 L.Ed.2d 471 (1975); *Nickerson v. Bearfoot Sole Co.*, 311 F.2d 858 (6th Cir. 1962), *cert. denied*, 375 U.S. 815, 84 S.Ct. 48, 11 L.Ed.2d 279 (1963).

C. *The Validity of the Sweet Patent*

157. The Sweet patent is not invalid for failure to disclose the best mode contemplated by Sweet for practicing his invention, under 35 U.S.C. § 112, by reason of Sweet's failure to disclose the properties of ink to be used in operation of his device, or the use of a compensation network in connection with the operation of his device.

158. July 31, 1963, is the effective filing date of Sweet's application for his patent, and said filing is not rendered ineffective for failure to disclose the best mode contemplated by Sweet for practicing his invention at that time, under 35 U.S.C. §§ 112, 120; by reason of Sweet's failure to disclose the use of a catcher in the operation of his device; the properties of ink to be used in the operation of his device; or the use of a compensation network in connection with the operation of his device.

159. The Sweet patent is not invalid, under 35 U.S.C. § 102(b), by reason of any activity in connection with Sweet's work within the year preceding July 31, 1963.

160. Because CQSR 31 is not a printed publication within the meaning of 35 U.S.C. § 102(b), the Sweet patent is not invalid under 35 U.S.C. § 102(b) by reason of the distribution of CQSR 31, containing a description of Sweet's invention, prior to July 31, 1962.

161. The Sweet patent is not invalid for violation of the duty of candor to the patent office, by reason of Sweet's failure to disclose the Waage reference to the patent office during the prosecution of his patent applications.

162. The Sweet patent is not invalid under 35 U.S.C. § 103 because the differences between the subject matter patented by Sweet and the prior art are such that subject matter taken as a whole would not have been obvious to a person having ordinary skill in the art at the time of Sweet's invention.

D. *The Validity of the Lewis-Brown Patent*

163. The Lewis-Brown patent is not invalid for violation of the duty of candor to the patent office, since Lewis and Brown did disclose Sweet's work with a sine-wave generator to the patent office during the prosecution of their patent applications.

[14] 164. A patent carries a statutory presumption of validity. 35 U.S.C. § 282. The presumption of validity gives the grant substance and value but is not conclusive. *Westinghouse Electric Corp. v. Formica Insulation Co.*, 266 U.S. 342, 348, 45 S.Ct. 117, 119, 69 L.Ed. 316 (1924). The presumption has no independent evidentiary value in infringement litigation but only serves to place the burden of proof on the party who asserts invalidity as a defense to infringement. *Reynolds Metals Co. v. Acorn Building Components, Inc.*, 548 F.2d 155, 160 (6th Cir. 1977).

165. The Lewis-Brown patent is invalid under 35 U.S.C. § 102(f), to the extent it claims invention of the use of a sine-wave generator in connection with the operation of Sweet's invention because Sweet, and not Lewis and Brown, invented the subject matter so described.

166. The Lewis-Brown patent is invalid under 35 U.S.C. § 103 because the differences between the subject matter sought to be patented by Lewis and Brown and the prior art are such that the subject matter taken as a whole would have been obvious to a person of ordinary skill in the art at the time Lewis' and Brown's invention was made.

WHEREFORE, based upon the foregoing, it is the opinion of this Court that:

(1) Plaintiffs are not precluded from prosecuting this infringement action by reason of laches;

(2) Mead's DIJIT printer does not infringe, literally or as an equivalent, on claims 1 and 33 of the Sweet patent or on claim 2 of the Lewis-Brown patent;

(3) The Sweet patent is valid; and

(4) The Lewis-Brown patent is invalid.

The Defendant Mead is to prepare a Judgment Entry, in accordance with the above opinion, and submit same to this Court for filing within twenty-one (21) days from date of receipt of this opinion.

APPENDIX B

In The

UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF OHIO

MEAD DIGITAL SYSTEMS, INC.,

Plaintiff,

v.

A. B. DICK COMPANY and GOULD, INC.,

Civil Action No. C-3-78-177

Defendants.

and

A. B. DICK COMPANY and GOULD, INC.,

Plaintiffs,

v.

THE MEAD CORPORATION,

Civil Action No. C-3-78-287

Defendant.

MEAD'S OPPOSITION
TO
MOTION FOR ENTRY OF FINAL JUDGMENT
IN FORM PROPOSED BY PLAINTIFFS

The judgment proposed by A. B. Dick and Gould is defective since it fails to provide a declaration of the legal scope of the patents in suit. Such relief was raised by Mead's action for declaratory judgment,

and was set forth by Mead as specific issues to be tried in the Final Pretrial Order (copies of the pertinent pages are attached).

The scope and meaning of the patents were major issues at trial, and were disputed rights determined by the Court.

Mead should not be subjected to relitigation of these same issues in the future, and is entitled to a declaration of these rights in the judgment.

If Mead was too editorial in its proposed judgment as alleged by Plaintiff, Mead apologizes and asks the Court to draft its own judgment declaring the legal scope of the patents, whether they be valid or invalid in their scope.

Respectfully submitted

/s/ Bill Durkee

Bill Durkee
Edward W. Goldstein
Ben D. Tobor
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Appendix B

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Appendix B

(7) Did the demonstrations by Sweet after August 1, 1962, amount to a public use or placing on sale within the meaning of 35 U.S.C. §102?

(8) Is the Sweet patent unenforceable and/or invalid because of failure of Sweet to disclose to the Patent Office prior art known to him as being pertinent?

(9) Are any or all of the claims of the Sweet patent invalid for being vague and indefinite and failing to point out and distinctly claim the subject matter set forth in the specification of said patent?

(10) What is the legal scope of the claims of the Sweet patent?

(11) Are any of the claims of the Sweet patent invalid or unenforceable for attempting to claim or for claiming subject matter invented by Sweet and Cumming or Lewis which is not disclosed in the

Appendix B

Sweet specification?

(12) Does the legal scope of the claims of the Sweet patent define patentable subject matter in view of prior art?

(13) Has the legal scope of the claims of the Sweet patent been infringed by any product of Mead?

(14) Is the Lewis patent unenforceable and/or invalid because of failure of Lewis to disclose to the Patent Office prior art known to him as being pertinent?

(15) Are any or all of the claims of the Lewis patent invalid for being vague and indefinite and failing to point out and distinctly claim the subject matter set forth in the specification of said patent?

(16) What is the legal scope of the claims of the Lewis patent?

(17) Does the legal scope of the claims of

the Lewis patent define patentable subject matter in view of prior art?

(18) Has the legal scope of the claims of the Lewis patent been infringed by any product of Mead?

(19) Did A.B. Dick waive its right to enforce the Sweet patent or the Lewis patent against Mead, either as to recovery for past damages or as to enforcing the patent in the future, by failing to bring an action against Mead and allowing Mead to continue investment in ink jet technology?

(20) Does Mead have the right to practice within the scope of the Sweet and Cumming patent without accounting to its joint owner A.B. Dick?

(21) Are the Sweet and Lewis patents unenforceable or subject to licensing at reasonable royalty rates because A.B. Dick acquired the Sweet and Lewis

patent rights from independent third parties and combined and concentrated the power of the two individual patent monopolies to gain unfair and

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APPENDIX C

In The
UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF OHIO

MEAD DIGITAL SYSTEMS, INC.,	)	
	)	
Plaintiff,	)	
v.	)	Civil
A. B. DICK COMPANY	)	Action No.
and GOULD, INC.,	)	C-3-78-177
	)	
Defendants.	)	
	)	
and	)	
	)	
A. B. DICK COMPANY	)	
and GOULD, INC.,	)	
	)	
Plaintiffs,	)	
	)	Civil
v.	)	Action No.
THE MEAD CORPORATION,	)	C-3-78-287
	)	
Defendant.	)	

MEMORANDUM IN REPLY TO MEAD'S OPPOSITION TO PLAINTIFF'S MOTION FOR ENTRY OF FINAL JUDGMENT IN FORM PROPOSED BY PLAINTIFFS

Mead's only criticism of the form of Final Judgment proposed by plaintiffs is that it fails, according to Mead, to provide "a declaration of the legal scope" of the patents in suit. Mead, the Court is told, "should not be subjected to re-litigation of the same issues in the future"--

i.e., the issues which were tried last November and recently decided.

Mead is perfectly correct in contending that the Final Judgment entered in this case should dispose, once for all, of the matters which were in controversy at the trial--specifically, whether the patents in suit are valid and whether they have been infringed by any of the apparatus that Mead, on the date of trial, had manufactured and sold. And a Final Judgment in the form proposed by plaintiffs will fully protect Mead's rights in that regard; it would adjudge (a) that the Sweet patent is valid, (b) that the Lewis-Brown patent is invalid, and (c) that neither patent has been infringed by any of the ink-jet printing equipment that Mead has sold. Thus, the Final Judgment proposed by plaintiffs fully and finally disposes of every issue that

was before the Court at the trial of this cause.

What Mead really wants--and is trying to secure by its own proposed form of Final Judgment--is an advisory opinion which would finally adjudge, without either trial or argument, that the Sweet patent--in addition to being not infringed by the Dijit machines--would also be not infringed by other ink-jet printing equipment that Mead may design and market in the future. For the Court to issue such an advisory opinion, on whether hypothetical ink-jet printers would fall within the scope of the Sweet patent, would violate the U.S. Constitution. The judicial power of Federal Courts is limited to resolving "real and substantial" controversies, "admitting of specific relief through a decree of a conclusive character, as distinguished from an opinion

advising what the law would be upon a hypothetical state of facts" (Aetna Life Insurance Co. v. Haworth (1937), 300 U.S. 227, 241). To the same effect, in a patent context, see Sweetheart Plastics Inc. v. Illinois Tool Works, Inc. (1st Cir., 1971), 439 F.2d 871, 874-875.

Only because it wants an advance immunity for its next generation of ink-jet printers is Mead asking this Court to adjudge the "legal scope" of the patents in suit. But this Court, under the U.S. Constitution, has no power to give Mead any such advance immunity.

Should Mead, in the future, develop and market a form of ink-jet printer different from the ones before the Court in this action, and should that new printer be accused of infringement, then a brand-new "case or controversy" would be created,

which this or some other Court could properly resolve by a new trial. But no such determination can be made in this case.

It is true that Mead, in the Pretrial Order, raised an issue as to what was the "legal scope" of the patents in suit, but plaintiffs never conceded that any such issue was involved. The only questions of infringement before the Court are those presented by the Mead Dijit machines, and the Court can only pass on the "legal scope" of the patents to the extent required for resolution of those questions.

Mead's proposed form of Final Judgment should be rejected and the one tendered by plaintiffs should be entered.

Respectfully submitted,

/s/ Howard P. Krisher

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Appendix C

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APPENDIX D

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF OHIO
200 West Second Street
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Chambers of
Walter H. Rice
District Judge

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January 25, 1982

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Re: Mead Digital Systems v. A.B. Dick Company, et al. A.B. Dick Company,

Appendix D

et al. v. The Mead Corporation
Case Nos. C-3-78-177 and C-3-78-287

Gentlemen:

Herein please find the too-long delayed Final Judgment Entry in the captioned cases.

I have utilized the form of proposed Judgment Entry furnished by Mead, with one exception, to wit: in paragraph numbered 3, I have deleted the words "as so construed". Perhaps I am missing that which is as obvious as the nose on my face, but I simply do not feel that those words add anything to the overall finding. In other words, I have construed the scope of the Sweet patent in paragraph numbered 2. Obviously, it is an inference from such a finding that the patent is valid as so construed. I simply see no reason to express that which is quite obviously inferred.

Sincerely,

/s/ W. Rice

WALTER H. Rice

WHR:slc

Enclosure

APPENDIX E

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF OHIO
WESTERN DIVISION

MEAD DIGITAL SYSTEMS, INC.	:	
Plaintiff,	:	
vs.	:	Case No. C-3-78-177
A.B. Dick Company and GOULD, INC.,	:	
Defendants.	:	
and	:	
A.B. DICK COMPANY and GOULD, INC.,	:	
Plaintiffs,	:	
vs.	:	Case No. C-3-78-287
THE MEAD CORPORATION,	:	
Defendant.	:	

FINAL JUDGMENT

These actions came on for trial before the Court, Honorable Walter H. Rice, District Judge, presiding, and the issues having been duly tried and a decision having been duly rendered,

Appendix E

It is Ordered, Adjudged, and Declared:

1. Mead's Dijit printer does not infringe Sweet Patent No. 3,596,275.

2. The Sweet Patent is limited in scope to oscillographic recording.

3. The Sweet patent is valid.

4. Mead's Dijit printer does not infringe Lewis-Brown Patent No. 3,298,030.

5. The Lewis-Brown patent is limited in scope to printing of characters with charged droplets that are deflected transverse to the relative movement between the paper and nozzle.

6. The Lewis-Brown patent is invalid.

7. A.B.Dick and Gould are not precluded from prosecuting the patent infringement action by reason of laches.

8. A.B. Dick and Gould shall take nothing, and the patent infringement actions by their complaint and counterclaim are dismissed on the merits.

Appendix E

9. The Mead Corporation and Mead Digital Systems shall recover of A.B. Dick and Gould their costs of the actions.

Dated at Dayton, Ohio, this 26th day of January, 1982.

/s/ Walter H. Rice
WALTER H. RICE
UNITED STATES DISTRICT JUDGE

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APPENDIX F

A.B. DICK COMPANY and Gould, Inc., Plaintiffs,

v.

BURROUGHS CORPORATION, Defendant.

No. 78 C 75.

United States District Court, N.D. Illinois, E.D.

Oct. 29, 1982.

On Counterclaims Nov. 5, 1982.

Upon defendant's motion for summary judgment in suit alleging patent infringement, the District Court, Shadur, J., held that: (1) decision of District Court for Southern District of Ohio upholding validity of patent on an oscillographic ink-jet printing device but construing its claims narrowly collaterally estopped plaintiff from claiming in instant suit that its patent was broader in scope than the Ohio court had found, and (2) patent No. 3,596,275 on an oscillographic ink-jet printing device was not infringed.

Motion granted.

Appendix F

1. Patents ⇐327(13)

Decision of District Court for Southern District of Ohio upholding validity of patent on an oscillographic ink-jet printing device but construing its claims narrowly collaterally estopped plaintiff in the action from claiming that its patent was broader in scope than the Ohio court had found.

2. Judgment ⇐634

Four showings necessary for invocation of defensive collateral estoppel by nonparty to earlier action are: (1) issue must be identical to one determined in the first action; (2) that issue must have been actually litigated in the first action; (3) resolution of issue must have been essential to final judgment in first action; and (4) plaintiff must have had a full and fair opportunity to litigate the issue in the first action.

3. Patents ⇐234

Patent No. 3,596,275 on an oscillographic ink-jet printing device was not infringed.

Dugald S. McDougall and Keith V. Rockey, McDougall, Hersh & Scott, Chicago, Ill., for plaintiffs.

L. Michael Jarvis, Allegretti, Newitt, Witcoff & McAndrews, Chicago, Ill., for defendant.

Appendix F

MEMORANDUM OPINION AND ORDER

SHADUR, District Judge.

A.B. Dick Company ("A.B. Dick") sues Burroughs Corporation ("Burroughs"), claiming Burroughs' ink-jet printer infringes United States Patent No. 3,596,275 (the "Sweet patent").[1] Burroughs has now moved for summary judgment, claiming the collateral estoppel effect of a recent District Court opinion precludes any finding of infringement here. For the reasons stated in this memorandum opinion and order, Burroughs' motion is granted.

A.B. Dick-Mead Litigation

Shortly after this action was instituted, the same plaintiffs sued The Mead Corporation ("Mead"), claiming Mead's ink-jet printer infringed both the Sweet and Lewis-Brown patents. Mead's subsidiary in turn filed a declaratory judgment action in the Southern District of Ohio, challenging both validity and infringement. Both Mead actions were consolidated and tried before

1. A.B. Dick owns the Sweet patent. Initially the Complaint also charged infringement of United States Patent No. 3,298,030 (the "Lewis-Brown patent"), owned by co-plaintiff Gould, Inc. and licensed exclusively to A.B. Dick. However, the parties have stipulated to dismissal of the Lewis-Brown infringement claims with prejudice, but subject to reinstatement if Judge Rice's ruling as to invalidity of that patent, *Mead Digital Systems, Inc. v. A.B. Dick Co.*, 521 F.Supp. 164, 182–83, 185 (S.D.Ohio 1981), is reversed or vacated on appeal.

District Judge Walter Rice in Ohio. Though he upheld the Sweet patent's validity, he construed its claims narrowly and hence found no infringement by Mead. *Mead Digital Systems, Inc. v. A.B. Dick Co.*, 521 F.Supp. 164 (S.D.Ohio 1981).

Burroughs contends Judge Rice's findings as to the scope of the Sweet patent call for collateral estoppel treatment and, as a matter of law, require rejection of A.B. Dick's infringement charges. A.B. Dick disputes Burroughs on every level, forcing a careful analysis of the relevant portion of *Mead*.

Scope of the Sweet Patent Under Mead

In deciding *Mead* Judge Rice defined the scope of the Sweet patent narrowly. He found that patent disclosed only an *oscillographic*[2] ink-jet printing device, which could directly record on paper the *waveform* produced by a continuously varying electrical signal. 521 F.Supp. at 173. He defined a waveform as "the pictorial repre-

2. Judge Rice adopted the definition of "oscillograph" contained in the McGraw-Hill Encyclopedia of Science and Technology:

> A measurement device for determining waveform by recording the instantaneous values of a quantity such as voltage, as a function of time. It consists of three major components: (1) a primary detector for sensing the instantaneous values of the quantity, (2) the timing system for introducing a time scale on the record, and (3) some means for recording the waveform.

sentation of the form or shape of a wave *with respect to time*" (*id.*, emphasis added). He described the recording process of the Sweet patent in greater detail (*id.*):

> The waveform is recorded, in accordance with the Sweet patent disclosures, by the imprint of uncharged and variably charged ink droplets on various positions on a paper. In every embodiment disclosed in the Sweet patent, the waveform of a continuously varying signal is recorded by a process which involves: charging each ink droplet in a succession of droplets in proportion to the instantaneous value, including zero, of an electric signal which varies as a function of time; and then passing the variably charged droplets through [a pair of constantly charged deflecting plates] to deflect the droplets through variable trajectories in order to produce on the paper a trace of the incoming waveform.[3]

There can be no doubt of the fundamental limitation of the Sweet patent adjudicated in *Mead*. As Judge Rice further found (*id.* at 175):

3. Each droplet's deflection (and the height of its trajectory) is a positive function of the magnitude of the charge it receives. Thus the amount of charge applied to each ink droplet—the "signal" voltage—dictates where it will land on the paper. Consequently any waveform can be reproduced on the paper simply by manipulating the electrical charges imposed on the procession of ink droplets.

> Sweet limited his invention to oscillography in which a picture of the incoming waveform is reproduced on paper by recording as a function of time the magnitude of deflection of each droplet in a succession so that the succession of deflected droplets traces the waveform on paper. This is the function and operation of an oscillograph.

He pointed to a like determination by the Board of Patent Interferences in a Patent Office interference proceeding between Sweet and Lewis-Brown (*id.* at 177):

> Sweet's system records a cursive line representative of the voltage of an unknown, incoming waveform. A "picture" of the waveform appears on a moving strip of paper.... It writes a continuous line, a cursive line, the length depending upon the length of the incoming signal.

And he held file wrapper estoppel precluded A.B. Dick from construing the Sweet patent claims to claim other than an oscillographic recorder (*id.* at 184).

Collateral Estoppel Effect of Mead's Determination of Scope

[1] *Blonder-Tongue Laboratories, Inc. v. University of Illinois Foundation,* 402 U.S. 313, 91 S.Ct. 1434, 28 L.Ed.2d 788 (1971) announced the demise of "mutuality" as an invariable prerequisite for issue preclusion (more commonly "collateral estoppel"). That concept of the defensive use of collateral estoppel has since expanded far beyond

its original application (*Blonder-Tongue* gave collateral estoppel effect to a prior holding of patent invalidity against the same plaintiff).[4]

[2] Now only four showings are necessary for the invocation of defensive collateral estoppel—issue preclusion—by a nonparty to the earlier action:

1. The issue must be identical to one determined in the first action.

2. That issue must have been actually litigated in the first action.

3. Resolution of the issue must have been essential to a final judgment in the first action.

4. Plaintiff must have had a full and fair opportunity to litigate the issue in the first action.

Continental Can Co. v. Marshall, 603 F.2d 590, 594–95 (7th Cir.1979); *Restatement of Judgments (Second)* § 29, at 291.

Burroughs contends Judge Rice's determination confining the Sweet patent to oscillographic recording should be given collateral estoppel effect. A.B. Dick counters that the first three collateral estoppel criteria have not been met.

Burroughs is plainly right. *Mead*'s ruling as to the scope of the Sweet patent

4. Indeed the Supreme Court later pioneered the extension of non-mutuality to the offensive use of collateral estoppel. *Parklane Hosiery Co. v. Shore*, 439 U.S. 322, 99 S.Ct. 645, 58 L.Ed.2d 552 (1979).

satisfies the first three collateral estoppel requirements (no issue is of course raised as to the "full and fair opportunity to litigate"):

1. Unquestionably the issue raised here—whether the Sweet patent is limited to oscillographic recording—is identical to an issue resolved in *Mead*. As already stated, Judge Rice expressly found (521 F.Supp. at 173) the "Sweet patent discloses only an oscillographic device." [5]

2. It is equally clear the scope of the Sweet patent was vigorously contested in *Mead*. That issue was specifically raised in the *Mead* Final Pretrial Order at 6. Extracts from the testimony of Sweet himself (521 F.Supp. at 173) confirm the issue was in fact raised during the trial. And Judge Rice rejected an A.B. Dick-tendered final order omitting a determination of scope in favor of a Mead-ten-

5. A.B. Dick does not attempt to distinguish that determination from issues presented here. Instead it argues (Pl.Mem. 15):

> Judge Rice's findings that Mead did not infringe because ink deflection was longitudinal of the relative movement between the paper and the nozzle is simply a different infringement issue than that presented by the Burroughs printer.

That contention is simply not responsive to the "identity of issue" requirement, for collateral estoppel is being applied to a determination of *scope* rather than *infringement*. Insofar as A.B. Dick's argument bears on the "necessity" requirement, it will be disposed of later in this opinion.

dered order making such a determination. A.B. Dick's conclusory assertion that the issue was not actually litigated cannot overcome those facts.

3. *Mead*'s resolution of the issue of scope (embodied in the final judgment itself) was surely necessary to that judgment. Because that ingredient is the key to this opinion (for it is the only matter on which A.B. Dick has any arguable position at all), it merits somewhat more extended treatment in the next few paragraphs.

First, Judge Rice's declaration was directly responsive to one form of relief requested by Mead in its declaratory judgment action (which, as will be recalled, was consolidated with A.B. Dick's patent infringement suit). Mead had specifically sought a declaration as to the scope and meaning of the Sweet patent.

Second, Judge Rice's ruling on the scope of the Sweet patent claims was an integral step in his disposition of the infringement claim:

1. As already indicated, he first determined the Sweet patent teaches only an oscillographic device.

2. Next he identified two specific characteristics of an oscillographic recorder:

(a) Its nozzle can produce a continuous waveform represented by a variable signal.

(b) It cannot deflect droplets longitudinally to the direction of paper movement.

3. Finally he deduced Mead was not guilty of infringement because its printer lacked both these oscillographic attributes.

Thus Judge Rice's first ruling—as to scope—was essential to his ultimate finding of non-infringement.[6]

In sum, Judge Rice's determination that the Sweet patent is limited to oscillography satisfies all the preconditions for collateral estoppel treatment in this proceeding. It remains only to consider whether the Burroughs printer too is oscillographic.

6. More precisely, Judge Rice's determination of the oscillographic nature of the Sweet patent was critical to his finding the Mead printer did not infringe as a substantial equivalent of the Sweet invention. To resolve that question he obviously had to determine (1) the functions served by the Sweet patented device and (2) the manner in which those functions were carried out. 521 F.Supp. at 180–81. By construing the Sweet patent claims as limited to oscillography, Judge Rice accomplished both ends.

Appendix F

Summary Judgment in Light of Mead

1. *Description of the Burroughs Printer*

[3] There is no factual disagreement as to how the Burroughs equipment operates. It is designed for printing characters on checks or similar documents in the manner explained in Dr. Richard C. Fedder's affidavit.

Ink drops emerging from the nozzle are aimed at the "ink return" catcher. If no voltage is applied to the charging electrodes, the drops are intercepted by the catcher and returned to the ink supply. If a positive voltage is applied, the droplets are deflected upward toward the moving document.

Each character is printed by selectively producing ink spots at certain locations on a dot matrix having nine rows and seven columns. As it moves from one column to the next, the ink drop stream is deflected successively to the nine locations (one above the others), and one or more drops can be directed to each of those locations. Drops are deflected to the nine predetermined, equally spaced positions by applying nine predetermined, and successively higher, voltage levels to the charging electrode. Each voltage level is commonly referred to as a "step" or "stair" of the "staircase" voltage. Depending on the character desired, certain locations on the matrix will require no drops. As to those locations, the corresponding "step" of the staircase volt-

age is omitted, inducing the uncharged drop to land in the "ink return." Each character is represented by an input code that translates into a series of staircase voltages having the configuration necessary to print that character.

2. *Comparison of the Burroughs Printer to an Oscillographic Recorder*

Burroughs asserts its printer is not an oscillographic machine as a matter of law. Several reasons are advanced in the Fedders affidavit:

1. Burroughs ink-jet printers cannot record waveforms of unknown shape.

2. Burroughs equipment does not reproduce waveforms because "the characters that are printed do not constitute a 'picture' or 'replica' of the incoming waveform."

3. Unlike an oscillograph, the Burroughs printer produces dot-matrix images, not a cursive line.

4. Burroughs equipment is not sold or used for oscillographic purposes.

A.B. Dick does not directly claim the Burroughs equipment is an oscillographic recorder. Instead it disputes Burroughs' second argument—the printer's inability to replicate the incoming waveform. On that score A.B. Dick adverts to part of the affidavit of J. James Stone:

In the A.B. Dick and Burroughs equipment ... the input signal to the charge

ring does represent the entire character being printed. For example, if the A.B. Dick or Burroughs equipment is set up to print the letter "R," the signal applied to the charging ring, when displayed on an oscillograph, is the letter "R." ... Both the A.B. Dick and Burroughs equipment, like the device shown in the Sweet patent, replicate the waveform of the incoming signal as the image printed by the ink jet.

Burroughs retorts that only a misuse of an oscillograph can generate even an approximate replica of the character image represented by the staircase waveforms. Referring to Stone's letter "R" example, Burroughs explains (R.Mem. 8–9):

Thus, if the staircase waveform of [the leftmost column in the 7 × 9 dot matrix] is applied to an oscillograph, the only way one might produce an "R", if at all, is to run the oscillograph much slower than intended, so as to compress the time scale—so that, instead of recording the steps of the waveform as intended, in staircase form, the oscillograph may show one step almost directly above another. Also, since the dwell time for the flat part of the step is much greater than the rise time between steps, these rise times may be suppressed, and not appear....

An analogy of this deliberate time compression, to distort the intended operation

> of an oscillograph, might be to tape record a symphony and then play it back at 100 times the intended recording speed—to hear a few seconds of noise. This obviously is a misuse of the tape recorder, assuming it could even be operated at the high speed, and effectively nullifies it for its intended purpose.

What controls however in this litigation is that by no stretch of the imagination can the Burroughs printer be viewed as an oscillograph. A.B. Dick's argument, even if true (and Burroughs clearly has the better of it), does not warrant such a finding. Merely because an oscillograph could *approximately* replicate a character (via drastic compression of the time scale) does not demonstrate the converse: that the Burroughs printer is capable of performing as an oscillograph.

As stated earlier Judge Rice employed the McGraw-Hill Encyclopedia of Science and Technology definition of an oscillograph (emphasis added):

> a measurement device for determining waveform by recording the instantaneous values of a quantity such as voltage, *as a function of time.*

But the Burroughs printer cannot record voltage signals as a function of time—no matter how the time scale is calibrated. All nine voltage levels (transmitted at *different* times) in each of the seven columns in the character matrix are recorded at the *identi-*

cal position on the "time" (horizontal) axis.[7] In short, the characters printed by the Burroughs equipment (the only type of image the equipment can record) are simply not waveforms.[8]

By the *Mead* definition, then—the definition that controls for these purposes—the Burroughs printer is not an infringing oscillographic device. That conclusion is also buttressed by specific findings underlying Judge Rice's decision on the scope of the Sweet patent. In limiting the Sweet patent claims to oscillographic recording, Judge Rice specifically held they did not disclose a device capable of producing *visible* discon-

7. Theoretically this problem could be avoided if the Burroughs printer were designed to print only one ink spot in each of the matrix columns. But its ability to generate waveforms in such hypothetical circumstances would be so circumscribed it could not be fairly classified as an oscillograph. First, it could not record waveforms with amplitudes in excess of the nine "steps." Second, it could not reproduce a *continuous* waveform unless each successive voltage quantity were within a "step" of the preceding voltage signal.

8. Even were the Burroughs characters a species of waveforms, categorizing the Burroughs printer as an oscillograph would still be highly questionable. As Burroughs points out, an oscillograph can only *imperfectly* portray a character (since its ink jet must *always* be moving). Furthermore, to provide an adequate depiction of a character the oscillograph's time scale may have to be so compressed that its underlying purpose—to record voltage values *as a function of time*—would be defeated.

tinuities in the waveform. 521 F.Supp. at 173–74. *Mead* confined the Sweet patent to oscillographic recording of *cursive* waveforms. *Id.* at 173–74, 175. In total contrast, even if the characters printed by the Burroughs equipment were to be labeled as waveforms, they are visibly *discontinuous* and non-cursive.

Conclusion

Mead determined the Sweet patent claims disclose only an oscillographic recorder. That determination binds A.B. Dick in this action under collateral estoppel principles. Burroughs' printer is not an oscillographic recorder. Accordingly Burroughs' printer does not infringe the Sweet patent as definitively construed and limited in *Mead.*

There is thus no genuine issue of material fact, and Burroughs is entitled to a judgment as a matter of law as to the Sweet patent claims.[9] This Court will await Burroughs' advice as to its antitrust counter-

9. Because this decision rests wholly on *Mead,* this Court has had no occasion to construe the Sweet patent independently. *Mead* is now on appeal, though that fact does not impair its effect for collateral estoppel purposes. This Court will leave to the litigants the taking of any protective steps (as they did with the Lewis-Brown patent) to provide for the possibility *Mead* might be reversed.

claim, the only remaining viable claim in this action.

ON COUNTERCLAIMS

At the conclusion of this Court's October 29, 1982 memorandum opinion and order (as well as during the status hearing at which the Court announced that decision granting Burroughs Corporation's motion for summary judgment), this Court invited the parties to address the Burroughs antitrust counterclaims, the only remaining viable claims in this action. Burroughs' counsel have since advised the Court of their agreement with opposing counsel under which the counterclaims may be dismissed with prejudice, subject to Burroughs' right to reinstate the counterclaims at its option if any of the patent infringement issues raised by the Complaint or Amended Complaint are reinstated at any time.

Accordingly the following final order is entered in this action:

1. A.B. Dick Company's claims of infringement of the Sweet patent by Burroughs' ink-jet printer are dismissed with prejudice, subject to reinstatement at A.B. Dick's option if Judge Rice's ruling as to the scope of the Sweet patent (*Mead Digital Systems, Inc. v. A.B. Dick Co.*, 521 F.Supp. 164 (S.D.Ohio 1981)) is reversed or vacated on appeal.

2. Burroughs' counterclaims in this action are dismissed with prejudice, subject to reinstatement at Burroughs' option if any of the issues of patent infringement asserted by A.B. Dick in this action are reinstated at any time.

APPENDIX G

A.B. DICK COMPANY, Appellant,

v.

BURROUGHS CORPORATION, Appellee.

Appeal No. 83-595.

United States Court of Appeals,
Federal Circuit.

July 27, 1983.

Upon defendant's motion for summary judgment in suit alleging patent infringement, the United States District Court for the Northern District of Illinois, Milton I. Shadur, J., 550 F. Supp. 1065 granted motion, and appeal was taken. The Court of Appeals, Jack R. Miller, Circuit Judge, held that judicial statements regarding scope of patent claims were entitled to collateral estoppel effect in subsequent infringement suit only to the extent that determination of scope was essential to final judgment on question of validity or infringement.

Reversed and remanded.

Nies, Circuit Judge, filed an opinion concurring in the result.

Appendix G

1. Judgment ⇐715(1), 720, 724

Collateral estoppel is appropriate only if issue is identical to one decided in first action, issue is actually litigated in first action, resolution of issue was essential to final judgment in first action, and plaintiff had full and fair opportunity to litigate issue in first action.

2. Judgment ⇐632

Collateral estoppel precludes plaintiff from relitigating identical issues by merely switching adversaries and precludes plaintiff from asserting a claim that plaintiff had previously litigated and lost against another defendant.

3. Judgment ⇐634

A trial court is not without some discretion to decide whether a particular case is appropriate for application of collateral estoppel.

4. Judgment ⇐634

Offensive use of collateral estoppel, where plaintiff seeks to estop defendant from relitigating issues defendant previously litigated and lost against another plaintiff, should not be allowed where it would be unfair to defendant.

5. Patents ⇐165(2)

Property right bestowed by a patent is measured, in the first instance, by the claims.

6. Patents ⇐239

One cannot avoid infringement of a patent merely by adding elements if each element recited in claims is found in accused device.

7. Patents ⇐327(13)

Judicial statements regarding scope of patent claims were entitled to collateral estoppel effect in subsequent infringement suit only to the extent that determination of scope was essential to final judgment on question of validity or infringement, and such statements had to be narrowly construed.

Dugald S. McDougall, Chicago, Ill., argued, for appellant; Keith V. Rockey, Edgar H. Schmiel and Peter S. Lucyshyn, Chicago, Ill., of counsel.

Charles W. Bradley, New York City, argued, for appellee; Steven D. Glazer, Cranford, N.J., Kevin R. Peterson and Leonard C. Suchyta, Detroit, Mich., of counsel.

Before KASHIWA, MILLER and NIES, Circuit Judges.

JACK R. MILLER, Circuit Judge.

This appeal in a patent infringement suit is from the United States District Court for the Northern District of Illinois, which granted appellee Burroughs Corporation's

("Burroughs") motion for summary judgment against appellant A.B. Dick Company ("A.B. Dick") on the basis of collateral estoppel.[1] The estoppel was premised on a previously-decided infringement action brought by A.B. Dick against Mead Digital Systems, Inc. ("Mead"),[2] wherein the United States District Court for the Southern District of Ohio held that Mead did not infringe the patent that is the subject of this suit against Burroughs. We reverse and remand.

BACKGROUND

A.B. Dick is the assignee of United States Patent No. 3,596,275 to Richard G. Sweet for "Fluid Droplet Recorder." The Sweet patent discloses a method and apparatus for applying ink drops to a sheet to form a trace. As a drop emerges from a nozzle it is given an electrostatic charge proportional to an input signal. The drop then passes a deflecting electrode having a constant electrostatic charge and is deflected thereby to a degree corresponding to the charge of the drop. Thus, by varying the charge on the drop, the amount of deflection (and, consequently, the point at which the drop im-

1. 550 F.Supp. 1065, 218 USPQ 90 (N.D.Ill. 1982).

2. *Mead Digital Systems, Inc. v. A.B. Dick Co.*, 521 F.Supp. 164, 213 USPQ 328 (S.D.Ohio 1981) (Rice, J.). Familiarity with that opinion will be presumed.

pacts a substrate) can be varied. The Sweet patent exemplifies an oscillographic recorder that forms a trace corresponding to the waveform of an input signal. Ink drops are deflected in a direction transverse to the direction the recording medium moves as a function of time. The claims in question do not specifically limit the invention in terms of direction of deflection or oscillographic recording.

Burroughs' accused device is an ink-jet dot-matrix alphanumeric character printer. It shapes letters or numbers of ink drops by deflecting drops upward to any of 9 vertical positions as the paper moves in a horizontal direction. Thus, the drops are deflected in a direction transverse to the direction the recording medium moves as a function of time.

In the prior infringement action, in which Mead sought a declaratory judgment against A.B. Dick, the District Court for the Southern District of Ohio (the "*Mead* court") held that Sweet patent claims 1 and 33[3] were valid but not infringed by Mead's

3. Claim 1 is a method claim and claim 33 is an apparatus claim. Claim 1 provides:

> 1. A method of making records on a record member by use of fluid droplets, comprising the steps of supplying writing fluid to a nozzle under pressure whereby a stream of writing fluid is projected toward the record member, applying cyclically varying energy

ink-jet "DIJIT" printer, which utilizes multiple vertically-arranged ink jets, each of which deflects ink drops only horizontally, parallel to the direction of paper movement. The *Mead* court found:

> 123. Each orifice in the DIJIT printer, and, as a result, the DIJIT system as a whole, *literally infringe* claim 1 or claim 88 of the Sweet patent, *if* "lateral" deflection in claim 1 is interpreted to include deflection *longitudinal* of the relative movement between the record member and the nozzle, *or* if deflection in

> at a predetermined frequency to the writing fluid to cause the stream issuing from the nozzle to break up into a succession of separate evenly spaced uniform droplets which move in free flight and initially in single file toward the record member, causing the stream adjacent to the nozzle to pass adjacent to a charging electrode, applying variable electrical signal values representative of the desired deflections to the charging electrode whereby individual droplets are electrostatically charged to effect different charges on at least some droplets of the succession, causing the droplets thereafter to pass in proximity to a deflecting electrode, applying a potential to the deflecting electrode to produce an electrostatic deflecting field through which the droplets pass whereby charged droplets are deflected laterally, with droplets having different charges moving through different trajectories, causing relative movement between the record member and the nozzle, and causing at least some of the droplets passing through said deflecting field to be deposited on the record member to make a record thereon.

multiple "trajectories" to multiple "regions" in claim 33 is interpreted to include deflection in that same direction.

124. Each orifice in the DIJIT printer *does not literally infringe* claim 1 or claim 33 of the Sweet patent, *if* said claims are interpreted to describe *only* deflection transverse of the time-axis of relative movement between the record member and nozzle, and thus define only oscillography.

521 F.Supp. at 180, 213 USPQ at 340. The court held, in the final judgment, that "[t]he Sweet patent is limited in scope to oscillographic recording."[4]

In this case, Burroughs' motion for summary judgment was grounded on the collateral estoppel effect of the holding of the *Mead* court that Mead did not infringe the Sweet patent. The court below, without analysis of the claims in the Sweet patent, granted Burroughs' motion because "Burroughs' printer is not an oscillographic recorder."

ANALYSIS

The issue before us is whether the *Mead* court's holding on the scope of the Sweet patent has collateral estoppel effect in this case.

4. Implicit in Burroughs' argument on appeal is the assumption that this statement refers to the scope of the claims and not merely to the scope of disclosure of utility.

[1] As properly stated by the trial court, collateral estoppel is appropriate only if: (1) the issue is identical to one decided in the first action; (2) the issue was actually litigated in the first action; (3) resolution of the issue was essential to a final judgment in the first action; and (4) plaintiff had a full and fair opportunity to litigate the issue in the first action.[5]

[2–4] Collateral estoppel "precludes a plaintiff from relitigating identical issues by merely 'switching adversaries' " and precludes a plaintiff "from asserting a claim that the plaintiff had previously litigated and lost against another defendant." *Parklane Hosiery Co. v. Shore*, 439 U.S. 322, 329, 99 S.Ct. 645, 650, 58 L.Ed.2d 552 (1979). At the same time, a court is not without some discretion to decide whether a particular case is appropriate for application of collateral estoppel. For example, offensive use of collateral estoppel, where a plaintiff seeks to estop a defendant from relitigating issues the *defendant* previously litigated and lost against another plaintiff, should not be allowed where it would be unfair to the defendant. *Id.* at 331, 99 S.Ct. at 651.

5. *Blonder-Tongue Laboratories, Inc. v. University of Illinois Foundation*, 402 U.S. 313, 91 S.Ct. 1434, 28 L.Ed.2d 788 (1971), eliminated the requirement of mutuality of estoppel in patent infringement suits involving patent claims previously held invalid in other litigation, and the parties are agreed that mutuality is not an issue in this case.

In the *Mead* case, the district court considered several interrelated issues, including validity, infringement, and, at the request of Mead, scope of the Sweet patent. A.B. Dick argues that the *Mead* court's broad statements regarding scope were not necessary to resolution of the validity and infringement issues before the court; that they were merely dicta and constitute an advisory opinion having no collateral estoppel effect. Burroughs argues that "scope" of the Sweet patent was a separate issue in Mead's declaratory judgment action; that A.B. Dick unsuccessfully argued lack of jurisdiction to decide that issue before the Mead court; and that the court's decision on the jurisdictional issue also has collateral estoppel effect.

[5] It is elementary that the property right bestowed by a patent is measured, in the first instance, by the claims. *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 339, 81 S.Ct. 599, 600, 5 L.Ed.2d 592 (1961); *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607, 70 S.Ct. 854, 855, 94 L.Ed. 1097 (1950). The *Mead* court, in resolving the infringement question, looked to the language of claims 1 and 33 in the Sweet patent. First, it determined that the limitation in claim 1 that the droplets are "deflected laterally" was ambiguous, because "it may mean deflection 'lateral' of the undisturbed stream of droplets emitting

from the nozzle ... or it may only mean deflection 'lateral' of the relative movement between the nozzle and the paper," and that claim 33 was "ambiguous in the same manner as claim 1." 521 F.Supp. at 174, 213 USPQ at 335. Second, it determined that the Mead DIJIT printer literally infringed claim 1 only if "lateral" deflection included deflection longitudinal of the relative movement between the record member and the nozzle and that it literally infringed claim 33 only if the "trajectories" given different drops included deflection in the same direction. *Id.* at 180, 213 USPQ at 340. The *Mead* court held, on the basis of claim interpretation, that the DIJIT printer did not infringe because it did not deflect droplets transversely of the relative direction of movement between the paper and the nozzle.

By contrast, application by the court below of collateral estoppel to the question of whether the accused Burroughs machine infringes claims 1, 3, 4, 10–13, 15, 16, 18, 24–26, and 30–33 of the Sweet patent was anomalous. Despite the fact that the Burroughs printer, *unlike* the DIJIT printer, *does* deflect droplets transversely of the relative direction of movement between the paper and the nozzle, the court did not compare the several claims in issue to the accused device. Instead, using the *Mead* court's statement that the Sweet patent "is limited in scope to oscillographic recording"

rather than focusing on the claims of the Sweet patent, it determined, on affidavits submitted by the parties: "By no stretch of the imagination can the Burroughs printer be viewed as an oscillograph."

Although we express no opinion on whether there is infringement in this case, we note that the claims in issue, if infringed, would only read on a *portion* of the Burroughs machine. Thus, the Burroughs machine includes additional elements not required by the claims, such as means to generate a signal as a step function representative of various alphanumeric characters.

[6] It is fundamental that one cannot avoid infringement merely by adding elements if each element recited in the claims is found in the accused device. *See Temco Electric Motor Co. v. Apco Manufacturing Co.*, 275 U.S. 319, 328, 48 S.Ct. 170, 173, 72 L.Ed. 298 (1928). For example, a pencil structurally infringing a patent claim would not become noninfringing when incorporated into a complex machine that limits or controls what the pencil can write. Neither would infringement be negated simply because the patentee failed to contemplate use of the pencil in that environment. In the instant case, however, the presence in the Burroughs machine of elements not specified in the Sweet patent claims, such as the input signal source, and the absence in the Burroughs machine of elements not

present in the Sweet patent claims (although relied on by the court as included in the claims), such as cursive trace and rate of relative movement between the nozzle and the record member, caused the court to hold that there was no infringement. Ironically, the court relied on the collateral estoppel effect of a decision of another court which held that a different machine did not infringe because it lacked a characteristic (transverse deflection) unquestionably found in the Burroughs machine. We conclude that such an application of the doctrine of collateral estoppel to the question of infringement was erroneous.

In *Studiengesellschaft Kohle v. Eastman Kodak Co.*, 616 F.2d 1315, 206 USPQ 577 (5th Cir.1980), the Fifth Circuit considered the applicability of collateral estoppel to questions of infringement. In previous litigation over the patent claims in question, the court determined that a process for polymerizing butadiene did not infringe the patent. In so holding, the court stated that the patent was limited to the polymerization of *ethylene*. When faced with the question of whether that judicial statement estopped the same plaintiff from asserting (against a different defendant) that a process for polymerizing *propylene* infringed, the court said:

> We acknowledge that language in [*Ziegler v.*] *Phillips* [*Petroleum Co.*, 483 F.2d 858 (5th Cir.1973)] states that the '332

> patent is limited to the polymerization of ethylene. That language, however, is not necessary to the determination of the issue in *Phillips*. Only our holding that the patent was not intended to encompass the formation of high-cispolybutadiene is necessary.
>
> Because our statements limiting the patent to the polymerization of ethylene are not necessary and essential to the result in *Phillips*, they may not be used as a basis for estoppel in the present case.

Id. at 1332–33, 206 USPQ at 593. We are in agreement with this reasoning. Except in the context of validity or infringement, judicial statements regarding the scope of patent claims are hypothetical insofar as they purport to resolve the question of whether prior art or products not before the court would, respectively, anticipate or infringe the patent claims. Regardless of whether the *Mead* court had jurisdiction to rule on the abstract scope of patent claims, we are persuaded that it would be unfair to give such a ruling collateral estoppel effect. *Cf. Parklane Hosiery Co. v. Shore*, 439 U.S. at 331, 99 S.Ct. at 651 (offensive use of collateral estoppel not appropriate where it would be unfair to the defendant).

[7] In view of the foregoing, we hold that judicial statements regarding the scope of patent claims are entitled to collateral estoppel effect in a subsequent infringe-

ment suit only to the extent that determination of scope was essential to a final judgment on the question of validity or infringement; further, that such statements should be narrowly construed. Burroughs argues that the *Mead* court's holding on scope "was an integral step in the judgment of noninfringement." We agree that the *Mead* court found it necessary to consider the Sweet patent's disclosure of the claimed invention functioning as an oscillographic recorder to resolve perceived ambiguities in claims 1 and 33. The court concluded, as a result of that consideration, that those claims required deflection of ink droplets transversely of the direction of relative movement between the nozzle and the record member. It is only that conclusion that was essential to the final judgment of noninfringement. Accordingly, we do not apply collateral estoppel to the court's broader statements with respect to the scope of the patent.

In view of the foregoing, the judgment of the district court is reversed and the case is remanded for further proceedings consistent with this opinion.

REVERSED AND REMANDED.

NIES, Circuit Judge, concurring in result.

I agree with A.B. Dick that the trial court misconstrued Judge Rice's ruling in the *Mead* case and that the grant of summary judgment based on giving collateral

estoppel effect to that erroneous interpretation was improper. Hence, I join in the majority's decision to reverse. On this ground alone the appeal is resolved. I do not agree that we must also decide "whether the *Mead* court's holding on the Sweet patent has collateral estoppel effect in this case." Such an analysis would be necessary only if we agreed that Judge Rice had made the broad ruling urged by Burroughs.

I

Judge Shadur translated Judge Rice's holding that "the Sweet patent is limited in scope to oscillographic record*ing*" to mean that only devices which were "oscillographic record*ers*" could infringe. That was error. Judge Rice made a number of specific findings which shows that he did not intend to rule on what type of device was an infringement.

Finding of fact No. 124, quoted by the majority, stated unequivocally that it is "deflection transverse of the time-axis of relative movement between the record member and nozzle" that "define[s] . . . oscillography." Finding of fact No. 143 states: "Sweet's patent claims invention of means for practicing one of the number of devices for the purpose of oscillographic recording." 521 F.Supp. at 182, 213 USPQ at 342. When the expression "oscillographic recording" as used by Judge Rice is read in the context of his entire opinion, I under-

stand that he used the term as a summary description of a method of recording a wave form by "deflection of ink droplets transversely of the deflection of relative movement between the nozzle and the record member."

In view of the trial court's error in construing "oscillographic recording" to mean specific devices rather than a particular mode of operation, the grant of summary judgment is clearly unsupportable.*

II

Whether collateral estoppel effect is to be given to the limited holding as to the mode of operation of appellee's invention is not an issue between the parties. Indeed, A.B. Dick concedes that so long as Judge Rice's opinion stands, its claims are so limited, and the Burroughs' device admittedly involves deflection transverse of the relative movement between the nozzle and the record member. Whether A.B. Dick can assert no broader scope to their claims because of general principles of collateral estoppel is irrelevant.

* I also note that there is a problem, not addressed by the trial court, in giving collateral estoppel effect against independent claims 4, 10, 11, 13, 24, 25, and 30 which were not before the *Mead* court.

III

Finally, as with collateral estoppel, the discussion of adding elements to avoid infringement is a non-issue. The trial court concluded only that the Burroughs device was not an oscillographic recorder. The error below resides in the court's failing to consider that the accused device may operate by oscillographic recording, not in some confusion over what is accused of infringement. To answer the contention not raised, the majority erects a hypothesis and then strikes it down with an assumption that the result is patently correct. I do not know that the conclusion is correct and am content to await the day when the issue is raised.